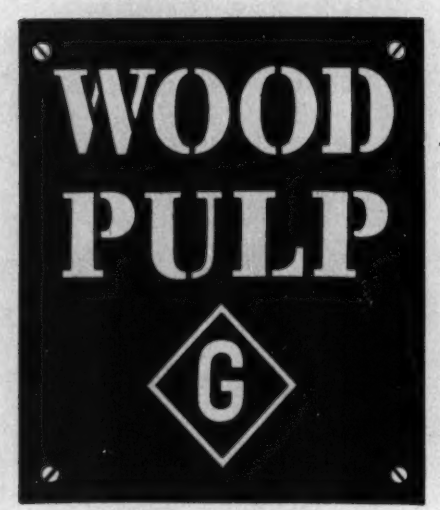
Paper
TRADE JOURNAL
JULY 13, 1951
SUPERINTENDENT'S NUMBER



Established 1886

"The refusal to be content with half measures, the striving for perfection which characterizes us as a nation will keep us on the road of progress."
EDDIE V. RICKENBACKER

It is no small part of the genius of America that industry is never satisfied, that new goals are always being envisioned—and achieved.

This unceasing desire to make a better product today and an even better one tomorrow has been the mainspring in the achievements of the American Pulp and Paper Industry.

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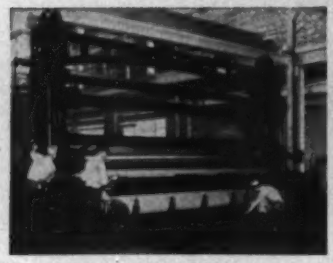
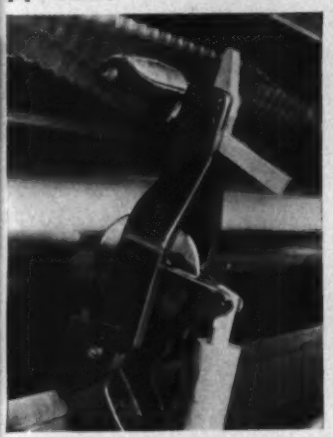
More MILLS depend on Camachines®



Camachine means dependability, speed and top roll quality at the winding end of your paper machine.



SCORE-CUT SHEAR-CUT

Choose either Camachine air-operated or integral type score-cut slitters, or Camachine shear-cut slitting units.

CAMACHINES EVERYWHERE! More than 400 paper and paperboard mills in the United States alone have one or more Camachines in service. More paper of all types is processed into rolls on Camachine equipment than on any other type of slitting and winding machinery.

CAMACHINES EVERY TIME! Rolls produced on Camachines include over 80 different product classifications, such as newsprint, book, kraft and wrapping papers; bristol and box boards; cigarette, gummed and novelty papers; laminated, sensitized, roofing and many other types of paper and paperboard.

CAMACHINES ALL THE TIME! Every new Camachine engineering development is deeply rooted in Cameron Machine Company's sixty years of experience and leadership in the manufacture of more efficient roll production equipment. Cameron research engineers will be pleased to consult with you regarding faster roll production at lower cost, and improved roll quality.

CAMERON MACHINE COMPANY • 61 POPLAR STREET • BROOKLYN 2, N.Y.

Four hundred dots on this map indicate, by state, the approximate location of paper and board mills where one or more Camachines are used.

AA-240

You can depend on Camachines®

Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet Belts BY

B.F.Goodrich

FIRST IN RUBBER

The B. F. Goodrich Company
Dept. PT-7
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

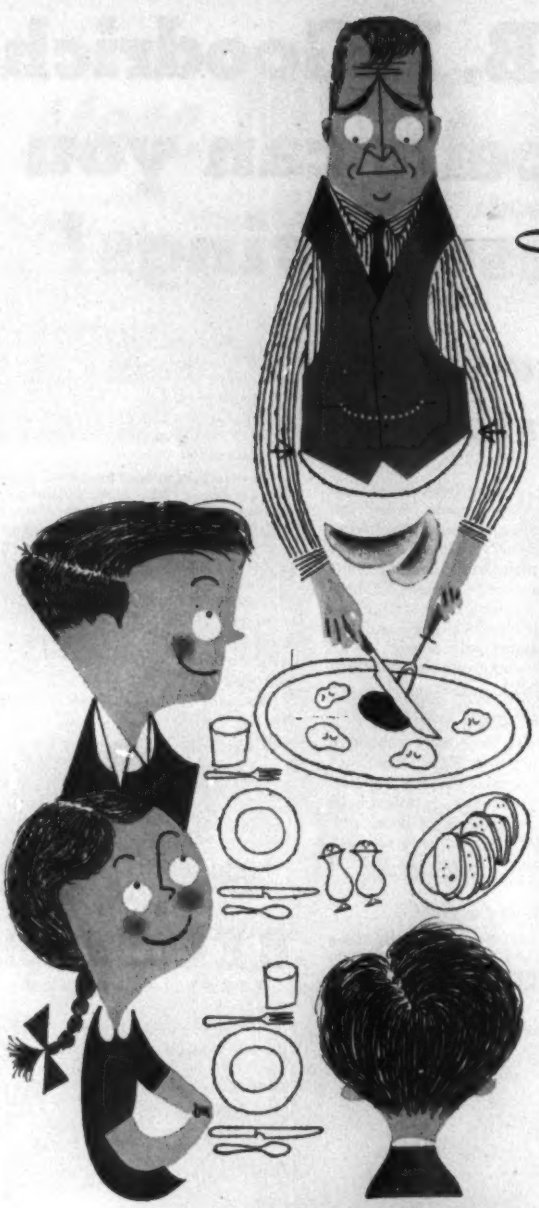
Firm Name_____

_____

Street Address_____

City_____

State_____



Stainless must go a long way, too!

To meet the demands of national defense and civilian needs, stainless must go a long way. That's why, now, more than ever — if you use stainless — use it wisely and efficiently.

Stainless is a name given to a broad list of grades and finishes—therefore, careful selection of the best available materials for your job is of prime importance. Here Crucible, a pioneer in the development of stainless steels, ca nhelp you get the most out of your share of stainless stocks through the unparalleled experience of our metallurgists and stainless fabricating specialists.

And when you can't get the grade of stainless you need, Crucible technical personnel can give you sound advice on the best available materials.

Until the time when stainless is more freely available . . . stretch your supplies of stainless. To do this . . make use of Crucible's wealth of stainless steel experience.

CRUCIBLE first name in special purpose steels

51 *years of* *Fine* *steelmaking*

STAINLESS STEELS

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Paper TRADE JOURNAL

VOL. 133 JULY 13, 1951 No. 2

FEATURES

Woods Trip Featured at Superintendents Meeting 46

The Place of the Paper Industry in the United States Economy 62

The Pulp Situation 64

Metal Allocation 68

What We Have Done to Remain Competitive 73

Recent Developments in Hydraulic Barking 75

Is the Superintendent a Salesman? 77

Stainless High Alloy Steels—Current Developments Affecting the Pulp and Paper Industry 80

Stock Preparation in Board Mills 84

Preliminary Refining of Hot Stock Kraft 92

Operation and Maintenance of Lime Sludge Kilns 93

Government Gospel 110

DEPARTMENTS

Trends 39

Our Business 41

News of the Week 43

People 44

Industrial Section 62

Prices 97

Materials 98

CLASSIFIED ADVERTISING 113

New Literature 101

New Equipment 102

Suppliers 103

Patents 105

Production 108

Obituaries 108

ADVERTISERS INDEX 126

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NEXT WEEK

Do you know your Hidden Labor Costs? Read the article by R. B. Knott, Vice-President Crown Zellerbach on accounting procedures on the so called "fringe benefits."

REMEMBER THESE DATES

JULY 24: American Pulp & Paper Mill Superintendents Assn., Michigan Division, Annual Field and Sport Day, at the Kalamazoo Country Club, Kalamazoo, Mich.

SEPT. 6-8: American Pulp & Paper Mill Superintendents Assn., New York, Canadian Division, meeting at Saranac Inn, Saranac, N. Y.

SEPT. 14-15: American Pulp & Paper Mill Superintendents Assn., Northeastern Division, meeting at Poland Spring House, Poland Spring, Maine.

SEPT. 14-15: American Pulp & Paper Mill Superintendents Assn., Northwestern Division meeting at Northern Holiday Resort, Marenesco, Mich.

SEPT. 16-19: American Institute of Chemical Engineers, Regional Meeting, French Lick, Ind.

SEPT. 20: American Pulp & Paper Mill Superintendents Assn., Michigan Division, Fall Meeting at Hotel Harris, Kalamazoo, Mich.

OCT. 10-12: American Pulp & Paper Mill Superintendents Assn., Southern and Southeastern Div's., George Washington Hotel, Jacksonville, Fla.

Oct. 29-31: National Foreign Trade Convention, Waldorf Astoria, New York City.

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Get 'Round-the-Clock Water Service with a Horton Tank

If fire endangers your plant at 3 A.M. . . . or any other time of night or day . . . be *sure* you're properly equipped to stop it. Install an automatic sprinkler system and a Horton elevated water tank. This positive combination means fire protection you can always depend upon.

Thousands of plants throughout the country realize that an automatic sprinkler system provides positive protection against fire *only* if it has an unfailing water supply. And that's exactly why these plants have installed Horton elevated water tanks.

Elevated storage utilizes one of nature's most dependable forces—*gravity*—to automatically provide water pressure at any hour. This is especially important during the early morning hours when plants are not generally frequented by employees and a blaze might get out of control before it is discovered.

Horton elevated water tanks with ellipsoidal bottoms are built in standard capacities ranging from 15,000 to 500,000 gallons. Their welded steel construction provides smoother surfaces for easier painting. Maintenance is reduced to a minimum.

So, when you're planning your automatic fire protection system — get the added protection of a gravity water supply. Write our nearest office today for complete details. We will be glad to furnish this information without obligation.

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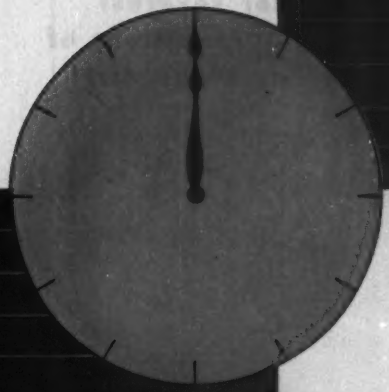

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You can obtain more hours of continuous operation . . . eliminate frequent chipper "shut-downs" . . . guarantee a steady flow of uniform chips by installing Heppenstall Knives in your chipper.

Made from our own electric induction steels, Heppenstall Chipper Knives are carefully forged and heat treated to give maximum service. They are hardened to hold a keen edge *longer*, yet have the proper ductility to resist breakage from impact strains. Excellent durability qualities enable Heppenstall Knives to withstand the high friction heat developed during long runs.

Standardize on Heppenstall Chipper Knives and get all the proved-in-service advantages that result in greater chip yield. Start saving production time . . . cut production costs . . . by ordering Heppenstall Chipper Knives today. Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall E. I. S. CHIPPER KNIVES

DEPENDABLE

under severest conditions of dust and dirt!

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- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16" to 4-15/16".

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of Mishawaka, Ind.

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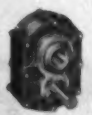

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ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

THE J-C HIGH DENSITY REFINER

RETAINS THE FIBER LENGTH WITH A MINIMUM OF FINES OR "THROUGH-FRACTION"

Note: curling effected by 0 15 refiner

USES: Defibering groundwood secondary screen rejects • Deshiving screened stock (groundwood)—chemical or semi-chemical • Defibering kraft and sulphite tailings • Will operate over a broad range of consistencies, but the specific power is exceptionally low at densities of 25% or higher • Self-cleaning—never plugs at any density • Has an inherently high capacity • Requires a minimum of floor space • Develops high mullen, tear and fold • Low in first cost and maintenance • Available in two sizes—with capacity of 25/50 tons/day or 75/150 tons/day • Used for introducing bleach solution uniformly into high density groundwood in the peroxide process • Develops appreciable curling as shown in photomicrograph above.

Manufacturers of the Zenith Continuous Pulp Press—Zenith Pulp Washer—High Density Refiner—Direct Heat Evaporator

J-C

A PRODUCT OF

JACKSON & CHURCH CO. • SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81

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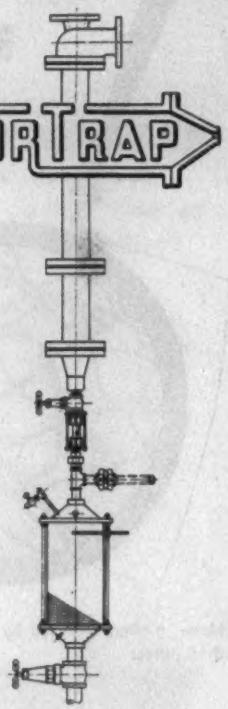
Repeat Orders Prove:

There is nothing better than a VORTRAP



Over 265 Mills in the United States are satisfied users.

72.7 Per Cent of these have REPEATED their Vortrap orders.

1 company has purchased over 500 Vortraps

7 companies have purchased over 100 Vortraps each.

13 companies have purchased over 50 Vortraps each.

They ALL Use Vortraps

- High-grade Paper Machines
- Paper Board Machines
- Pulp Mills
- Waste Rag Systems
- Waste Paper Systems

Our Customers Tell Us That Vortraps

- Improve quality
- Increase wire and felt life
- Increase production
- Decrease waste and maintenance
- Upgrade waste paper furnishes

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SAVING

America's TREES

Manpower, too

A lot of men talk about conservation, but the engineers at the St. Joe Paper Company really did something about it. Back in March, 1950, they put the Sutherland High Yield Sulphate System into operation in their 400-ton-per-day pulp mill at Port St. Joe, Florida. At the end of the year, here's what they'd saved:

26,200 cords of wood
Equal to 200,000 trees 10" in diameter

160,000 man-hours
for cutting and loading

These figures are based on a 20-percent increase in pulp yield, and cover less than a year's operation. During 1951, the engineers estimate that a 25-percent increase above normal yield will conserve 3,250 carloads of wood and a correspondingly greater number of man-hours.

In this hour of crisis, America's very existence depends on the vision of its engineers... men like those at St. Joe, who are constantly looking for better ways to utilize our resources of men and material in the fight for freedom.

For more information on this modern method of slashing pulp costs, write or wire.

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by SUTHERLAND REFINER CORPORATION

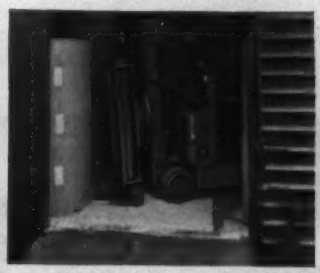
TRENTON 8, N. J.

Only ELWELL-PARKER'S Roll Handler gives you all these benefits:—

- **SNUG STACKING**—Close, orderly storage, impossible with many similar devices, is easy with this truck because its clamp can securely grip rolls short of their maximum diameter.
- **ADJUSTABLE CLAMP PRESSURE**—Grip is safe and positive, yet pressure can be changed for different papers, and automatically compensates for variations in winding tension of rolls.
- **NO PALLETS NEEDED**—One user saves 20% in space alone because no dunnage strips or pallets are required.
- **VERTICAL OR HORIZONTAL HANDLING**—This Elwell-Parker will both carry and stack rolls in either position, and can save time by rotating rolls while truck is traveling. In vertical tiering flats are avoided.
- **NO STOCK DAMAGE**—Many E-P roll handlers have quickly repaid their cost by reducing spoilage to practically zero.

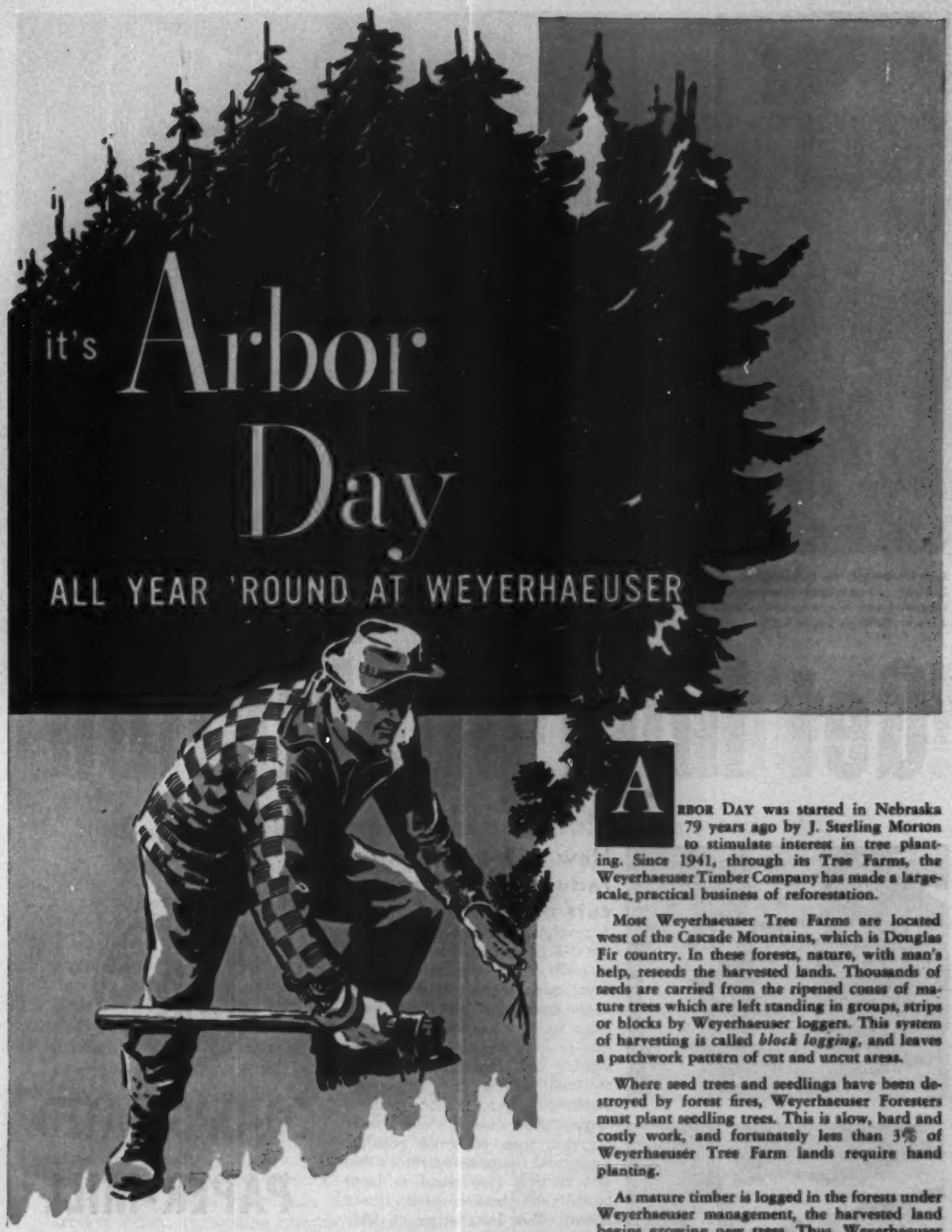
FREE, ILLUSTRATED BULLETIN

shows how this truck affords the *best way* to handle paper rolls. Write for E-P Reporter No. 8. The Elwell-Parker Electric Company, 4190 St. Clair Ave., Cleveland 3, Ohio.



This E-P roll handler with rotating scoop loads boxcars at mills extra fast because it can scoop up rolls more rapidly.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893



ARBOR DAY was started in Nebraska 79 years ago by J. Sterling Morton to stimulate interest in tree planting. Since 1941, through its Tree Farms, the Weyerhaeuser Timber Company has made a large-scale, practical business of reforestation.

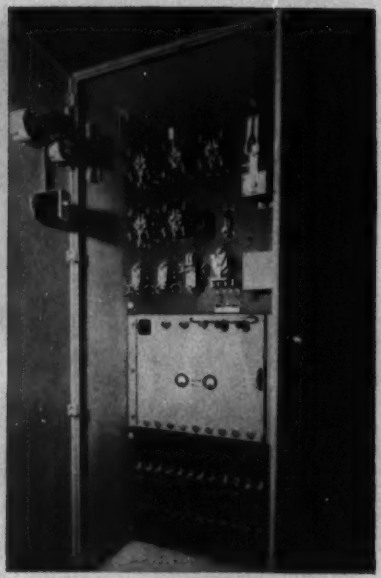
Most Weyerhaeuser Tree Farms are located west of the Cascade Mountains, which is Douglas Fir country. In these forests, nature, with man's help, reseeds the harvested lands. Thousands of seeds are carried from the ripened cones of mature trees which are left standing in groups, strips or blocks by Weyerhaeuser loggers. This system of harvesting is called *block logging*, and leaves a patchwork pattern of cut and uncut areas.

Where seed trees and seedlings have been destroyed by forest fires, Weyerhaeuser Foresters must plant seedling trees. This is slow, hard and costly work, and fortunately less than 3% of Weyerhaeuser Tree Farm lands require hand planting.

As mature timber is logged in the forests under Weyerhaeuser management, the harvested land begins growing new trees. Thus, Weyerhaeuser Tree Farm lands will continue to produce successive timber crops.

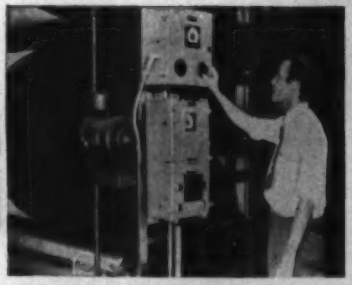
WEYERHAEUSER

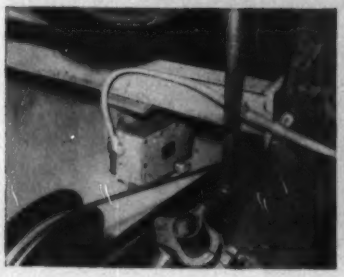
A co-ordinated but independent drive for each paper-machine section is provided by G-E multiple-generator sectional drive, which permits each section to operate at top efficiency with fast, accurate control. Shown here from the dry end is the G-E sectional drive at St. Regis Paper Co. in Tacoma, Wash.



Standardized circuits and simplified wiring in control panels permit faster installation and easier maintenance. Photo shows interior of a typical section control panel which includes electronic pre-amplifier, relays, contactors, and resistors.

Get high production





New G-E tensiometer reduces paper breaks, cuts down time!

A revolutionary new development, the G-E paper tensiometer prevents snap-offs caused by excess tension at dryer, calender and reel sections, reduces down time and broke, and helps increase output of uniform-quality rolls. Applicable to new or existing G-E electronic amplidyne sectional drives, it continuously regulates paper tension without damage to the sheet and with greater precision than otherwise possible. Equipment comprises operator's tension controls (top panel in upper photo) and tension head (lower photo). This installation at Ohio Boxboard Co., Rittman, Ohio, was added to an existing G-E drive. When engineered as automatic control into new drive systems, operator's tension controls are combined with the standard section operator's panel. For more data, write for Bulletin GEC-685.

CO-ORDINATED PAPER-MILL DRIVES

Multiple-generator system contributes to easy understanding, simple operation, and quick maintenance. Using a separate generator for each section eliminates the starting generator with its complicated switching that is characteristic of the single-generator system. Shown here, at the Fibreboard Products, Inc., mill at Antioch, Calif., are the G-E amplidyne sets (left) used as exciters for the G-E motor-generator sets (right). The amplidyne, with its fast response and high amplification factor, has been successfully used in over 800 paper-mill applications.

and a uniform sheet!

G-E multiple-generator sectional drive holds draw accurately between sections regardless of load changes—for higher speeds and less broke!

Continuous round-the-clock operation of your paper machine at high speed—to help increase production of uniform-quality paper, paperboard, newsprint or specialty papers—can be yours with a General Electric multiple-generator sectional drive. A growing number of successful installations proves it. And here's why:

Draw between sections is held accurately regardless of load changes, thus minimizing breaks, slack, or weaving at the reel. • Fast, accurate response of section speeds to draw adjustments eliminates guesswork from machine tender's "feel." • Adjustment of one section draw does not disturb other section draws, permitting quicker, more accurate draw changes. • Simple push-button control provides slack take-up for each section without affecting draw adjustments, thus reducing wrinkle-producing slack and calender cuts. • One or more sections may be started without shock to the whole system, and for wash-up and inspection, all sections may be run or jogged simultaneously at low speeds. • Over-all machine speed is easily adjusted from central master control panel.

Find out more about this production-boosting drive, representing more than 40 years of experience with the paper industry's specialized needs. Call your G-E representative today, or write for Bulletin GEA-5036. *General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

Clean

The fulling and washing of TENAX FELTS by our skillful experts assures you a clean white felt of correct texture for the paper you make.

No other felt is given more attention in these two important steps in its manufacture.

LOCKPORT FELT CO. TENAX FELTS NEWFANE, N. Y.

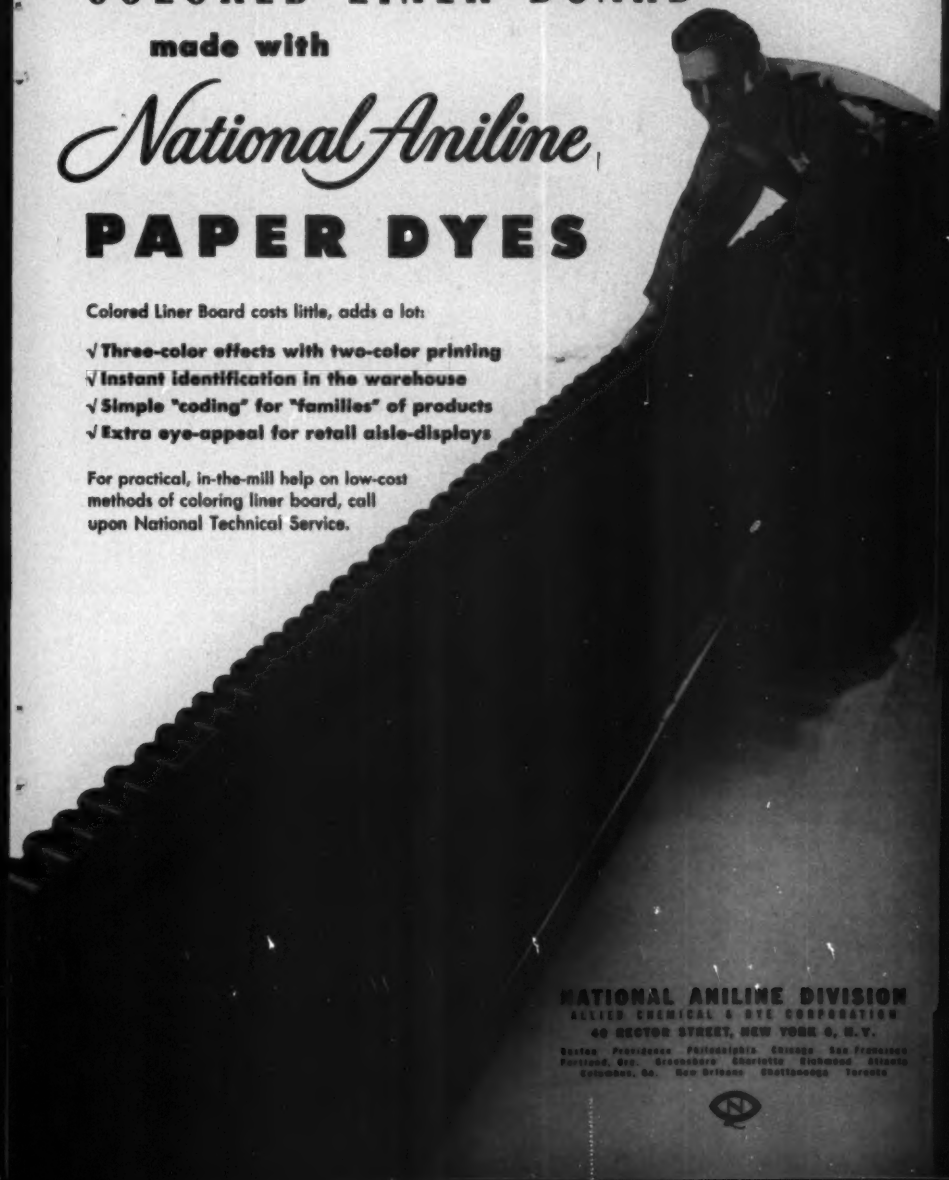
FOR SHIPPING CONTAINERS
THAT GET ATTENTION
ALL THE WAY TO THE POINT OF SALE

COLORED LINER BOARD

made with

National Aniline

PAPER DYES



Colored Liner Board costs little, adds a lot:

- √ Three-color effects with two-color printing
- √ Instant identification in the warehouse
- √ Simple "coding" for "families" of products
- √ Extra eye-appeal for retail aisle-displays

For practical, in-the-mill help on low-cost methods of coloring liner board, call upon National Technical Service.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Columbus, Ga. New Orleans Chattanooga Toronto

This Suction Couch Roll is running in a machine in the Knowlton Brothers' Mill at Watertown, New York, making specialty papers.

Latest reports from the mill indicate production has increased fifty per cent and the quality of paper has improved considerably since the installation of the Bagley and Sewall Suction Couch Roll. That's a result worth talking about — and there are others.

If you are thinking about suction rolls for your machines, tell us. Our sales engineers will gladly go over your requirements with you.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

Finland Representative
Aktiebolaget Ekstroms Mekaniska
Helsingfors, Finland

WATERTOWN, NEW YORK

NEW YORK OFFICE: 500 Fifth Avenue, New York, N. Y.

Foreign Representative
Castle and Overton, Inc.
630 Fifth Ave., Rockefeller Center, New York, N. Y.

SMIDTH

ROTARY KILNS

For

REBURNING LIME SLUDGE

The illustration above shows a modern, efficient, Smidth Rotary Kiln for reburning lime sludge at the plant of the West Virginia Pulp & Paper Co., Charleston, South Carolina.

F. L. Smidth & Co. are specialists in the design and manufacture of rotary kilns and have furnished numerous installations in many countries for burning lime, lime sludge, dolomite, magnesite, cement, ores, etc.

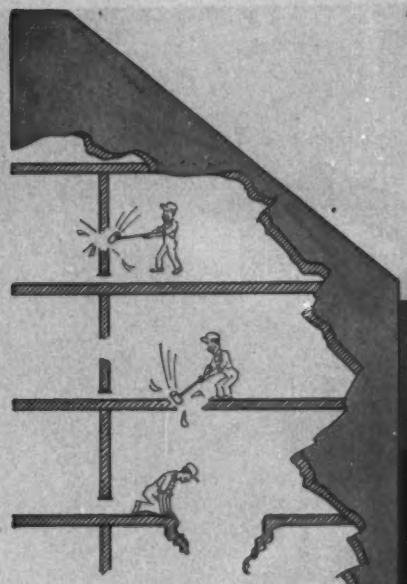
F. L. SMIDTH & CO.

11 WEST 42nd STREET · NEW YORK, N. Y.

LONDON · PARIS · COPENHAGEN · CANADA · BOMBAY

TEAR OUT YOUR FLOORS!

INSTALL A MODERN ROLL-HANDLING SYSTEM



The Cleveland Tramrail roll grab picks up rolls, sets them down or turns them from vertical to horizontal position or vice versa. All motions are motor-driven and controlled by the crane operator in the cab.

If you are struggling with the problem of storing and handling paper rolls in a multi-floor building with low ceilings as illustrated above, we say, "Tear out your floors and install a modern Cleveland Tramrail roll-handling system."

You then will have a single large, light, airy room in which several times as many rolls can be stored as on individual floors. Even if all of your present building is not required for roll storage purposes, you may find it profitable to make this change because of the tremendously increased capacity and the drastic reduction in roll-handling costs.

With a Cleveland Tramrail system, rolls can be stored vertically 42 feet and higher and the entire floor area utilized. Different types of paper are easily stored and retrieved. One man working in the crane cab usually can handle all operations in a large warehouse.

Let a Cleveland Tramrail engineer give you the details.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7114 EAST 307th STREET WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Process Steam Maintained at 2 Pressures

by Worthington Turbine Generators

This is how Worthington and a Far West cellulose mill set up the steam supply for utmost efficiency and flexibility.

We combined a non-condensing single automatic extraction unit with a condensing double automatic extraction unit. The 7500-kw units operate in parallel and, in addition to supplying plant power, furnish steam at two pressures for process requirements.

Along with the advantages of efficient operation and low cost and ability to adjust to mill requirements, this mill benefits from the manufacturer's *unit responsibility*.

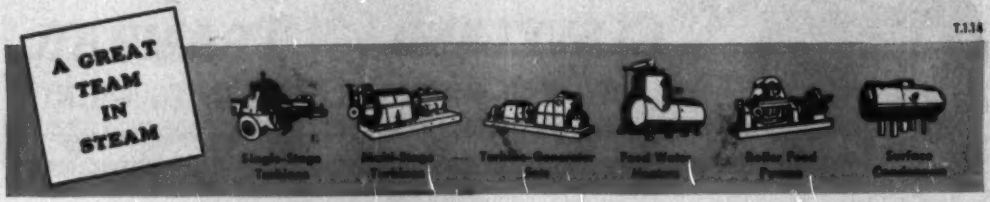
In this case, Worthington also furnished two 470-hp turbines to drive boiler feed pumps, two 452-hp turbines to drive induced-draft fans, two 146-hp turbines to drive forced-draft fans, and one 50-kw turbine-driven exciter set.

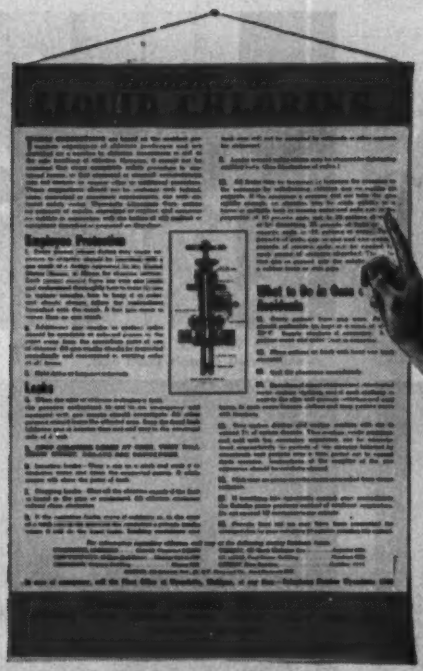
If you want proof *there's more worth in Worthington*, write Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, New York.

WORTHINGTON

STEAM TURBINE GENERATORS

T-134





Wyandotte Chemicals Corporation will be glad to send you, without charge, this extensive instruction chart on the handling of chlorine.

How to handle chlorine

"Know-how" is essential to the safe and economical use of chlorine. If it's mishandled, it can be troublesome.

That's why Wyandotte's Technical Service is so valuable to our customers.

We will recommend handling equipment for unloading systems . . . instruct you in the use of the system. If you wish to vaporize the chlorine, we will design equipment which fits your requirements. We will recommend materials of construction . . . will submit a cost estimate in detail.

If you wish to improve your control, we will recommend suitable instrumentation. We will make periodic inspections of your equipment. We will instruct your personnel. These services are available to every Wyandotte customer . . . large or small. They can be available to you.

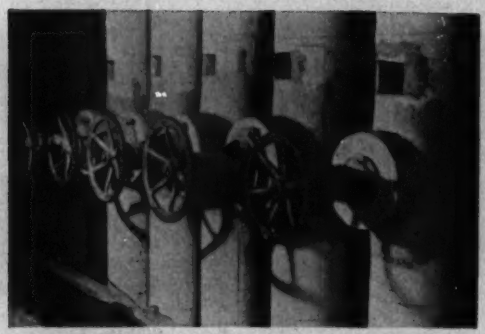
For details, write us at the address below.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • *OFFICES IN PRINCIPAL CITIES*

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte

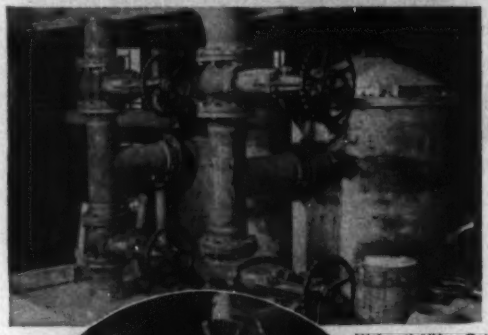
Walworth Iron Body Bronze Mounted Gate Valves (No. 726F) on steam line to paper machine.



Walworth Series 900 Pressure-Seal Cast Steel Gate Valves with welding ends on main steam lines.

Walworth Special Alloy Pulp Mill Gate Valves (No. 725FS) and Check Valves (No. 928FS) on liquor lines.

Walworth Extra Heavy Steeliron Gate Valves (No. 786F) and Globe Valves (No. 935F) on pressure reducing lines.



Walworth All Iron Gate Valves (No. 727F) in weak black liquor service.

Walworth Series 900 Pressure-Seal Cast Steel Gate Valves with welding ends on feed water lines to boiler.

Valves for Pulp and Paper Mill Service

Valves play an important part in the efficient operation of any pulp or paper mill. For new construction, or for maintenance, pulp and paper mill engineers are choosing the right valve for each specific service from Walworth's complete line.

Walworth manufactures valves and pipe fittings of steel, steeliron, iron, bronze, and special alloys. Illustrated are Walworth valves of latest design, installed in a variety of services in a modern pulp and paper mill.

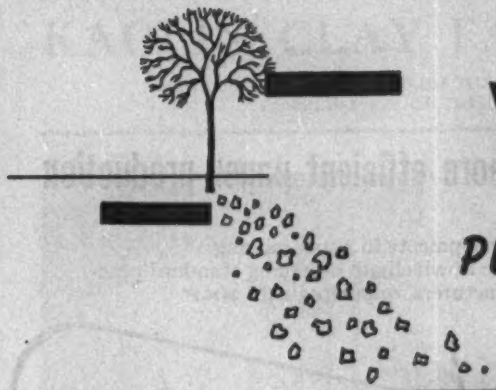
For further information and details of Walworth's complete line of valves and fittings, see your local Walworth distributor, or write for Catalog 47.

WALWORTH

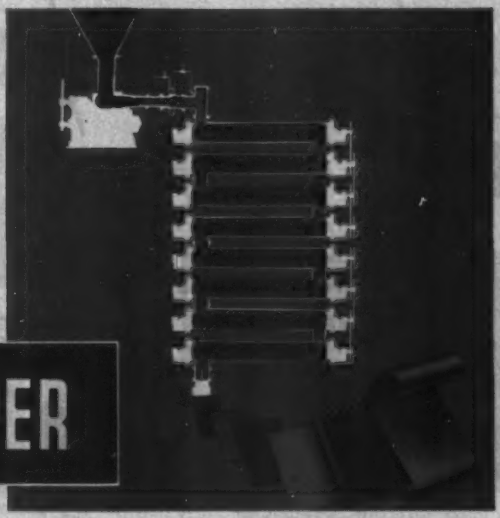
Pulp and Paper Mill Division

60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



WHERE WASTE MAKES HASTE IN PULP PRODUCTION



CHEMI-PULPER

Trade-Mark Reg. U. S. Pat. Off.

Whether it's pulp wood . . . waste from lumbering operations, forest trimmings or saw mill slabs and edging . . . any piece of wood that is big enough to be handled in a chipper, for conversion into chips, can be used to produce a uniform pulp . . . quickly, continuously . . . and at low cost with the CHEMI-PULPER.

Year after year, more mills realize the value of turning pulp wood and otherwise useless waste into desired grades of pulp to meet specific requirements, using either hard or soft woods, or mixtures of such woods. From portable chippers on the field or regular chippers at the mill . . . chips are conveyed to the CHEMI-PULPER and quickly converted into pulp of uniform quality. These pulps are used for making .009 for corrugating; flooring, roofing and automotive felts, and insulating board.

More than 65 operating units have been installed in the pulp and paper industry . . . units built with from 2 to 8 tubes, operating continuously in 150 to 175 p.s.i. steam pressure range; from 4 to 45 minutes reaction time, and handling up to 100 tons a day of wood chips dry basis.

Your investigation of the CHEMI-PULPER operation as compared to the batch digester will reveal the substantial savings in steam, power, and labor costs . . . with less chip storage, conveying equipment, and pulp storage capacity required for equivalent production.

CATALOG UPON REQUEST

PAPER and INDUSTRIAL APPLIANCES INC.
122 EAST 42nd STREET ● NEW YORK 17 N. Y.

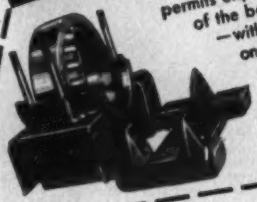
TRAIL BLAZERS to more efficient paper production

Four important developments in paper-making efficiency—some of which are becoming standard practice with bearing manufacturers, *originated with* SKF

THE FIRST

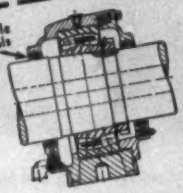
Spherical Roller Bearings applied to paper machinery, with results of smoother paths for power and real operating economies, were SKF Bearings.

THE FIRST



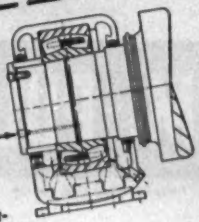
Rocker Mount Design, which permits expansion and contraction of the bearings and driers —with no lateral stresses on the side frames, was an SKF development.

THE FIRST



Triple Seals, for efficient non-rubbing sealing that retains lubricant independent of speed and temperature, were designed by SKF.

THE FIRST



System for Hydraulic Bearing Removal, where such dismounting of large or small bearings becomes a rapid and easy operation that eliminates damage to bearing and housings, was originated by SKF Engineers.

SKF

BALL AND ROLLER BEARINGS

Yes, SKF, in the paper industry as well as many others, has blazed the trail to more efficient, economical, reliable production. And right now, SKF Engineers in cooperation with machinery builders are *anticipating* the needs of advanced designs of paper machinery — so that years from now production will be even more efficient. SKF INDUSTRIES, INC., PHILADELPHIA 32, PA., *the Pioneers of the Deep Groove Ball Bearing—Spherical Roller Bearing—Self-Aligning Ball Bearing.* 7100

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

Integrity — Craftsmanship — Metallurgy — Tolerance Control — Surface Finish — Product Uniformity — Engineering Service — Field Service

KAOLIN CLAY FACTS...*for Paper Makers*

NUMBER 10 OF A SERIES FROM THE J. M. HUBER CORPORATION LABORATORIES
COMPLETE SET OF THIS SERIES AVAILABLE ON REQUEST

Determining viscosity of clay suspensions with the Stormer Viscometer at the Huber Clay Laboratories.

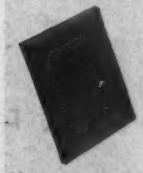
EVALUATING MINING CORE SAMPLES The evaluation of mining core samples is an important step in assuring uniform clays. The complete Huber cycle of laboratory tests consists of 12 separate steps; some of the more important are listed below:

1. Brightness determination of each sample.
2. Grit determination for each composite on 200 and 325 mesh screens.
3. Blunging and fractionating each composite so that the recovered fraction is composed of particles 75-80% by weight, finer than two microns.
4. Determining brightness of the purified and bleached composites.
5. Determining flow properties of the purified and bleached composites in a 70% clay-water system and in standard casein and starch colors. The ease of disintegration or "make down" is also observed.
6. Comparing composites against standards established for the paper and other industries.

PROCESSING KAOLIN CLAYS BY THE WET METHOD The wet process deals with clay particles suspended in water. This process is very complex, involving the separation of water-suspended clay fractions with controlled particle size ranges, the bleaching or whitening of the clay by chemical means, filtration and drying.

Modern production of water washed clays is accomplished in several stages: blunging—the initial disintegration of the crude clay lumps in water; fractionation—the separation of fractions with definite particle size ranges; bleaching—removal of the discoloration caused by iron compounds; filtration and drying of the filter cake.

Continuous drum type filter for water washed clay.



Have you received your copy of "Kaolin Clays and their Industrial Uses"—new Huber 144-page technical reference book? Write on your company letterhead.

EFFECT OF PARTICLE SHAPE ON FLOW CHARACTERISTICS

The shape of the clay particle is of major importance in controlling the flow of highly concentrated mixtures. During the flow of such mixtures, the solid particles are continually being rotated. Unless a volume of liquid having a diameter equal to the greatest length of the solid particles is available, the particles are apt to interfere with one another during rotation and produce resistance to flow. This phenomenon occurs freely in such threadlike molecules as rubber which produce high viscosities in very dilute concentrations. It follows, then, that solids composed of needles of thin plates should develop excessive viscosities when the systems become too crowded for free rotation. On the other hand, much larger quantities of cubical or spherical particles would produce freer suspensions. A recently published paper (*Paper Trade Journal*, February 16, 1951) from Huber laboratories discusses methods for controlling the viscosity of concentrated clay suspensions.

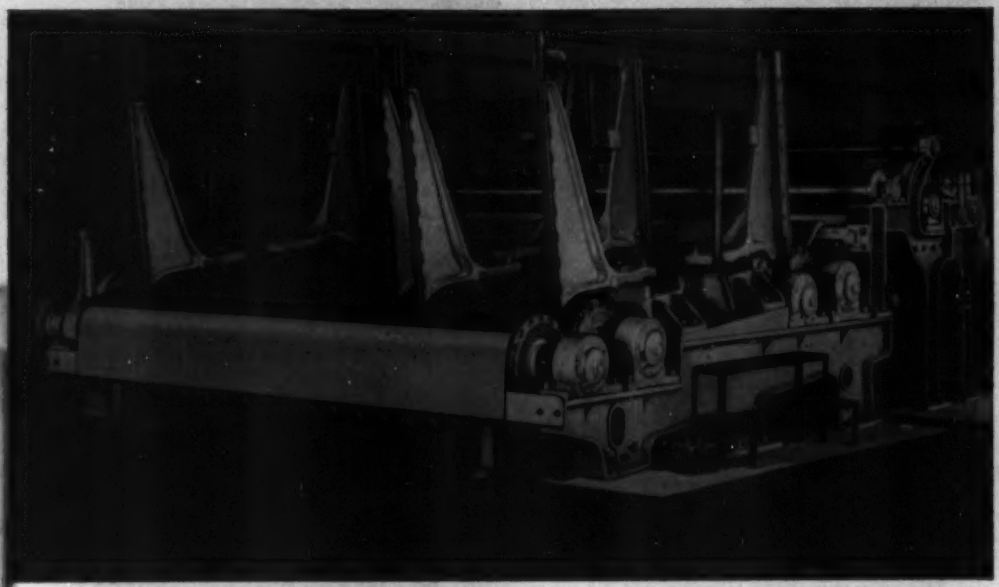
HUBER

J. M. HUBER CORPORATION, *100 Park Avenue, New York 17, N. Y.*

MINES & PLANTS—LANGLEY, S. C., GRANITEVILLE, S. C., AND HUBER, GA.

ONE OF THE WORLD'S LARGEST CLAY PRODUCERS

NEW MOORE & WHITE 4-DRUM WINDER



HERE is an expertly engineered and precision-built *heavy-duty* 4-drum board winder—fast, efficient and dependable to fit the tempo of today's demands and operations. It is operated by a Moore & White mechanical drive, and all moving parts run in anti-friction bearings. It is equipped with M & W shear-cut slitters to insure clean edges to the rolls.

This new Moore & White winder will wind rolls up to 84 inches in diameter. It is available in widths up to the maximum requirements of modern paperboard mills. We can equip it with automatic roll ejectors which permit the completed rolls to be quickly and easily removed from the winder drums without being tended or handled by an overhead crane.

Write or call us today for more detailed information. Our sales engineers will make a prompt survey of your requirements and oversee the installation of the Moore & White winder or other equipment you need for faster, more trouble-free and more profitable operation.

The MOORE & WHITE Company
15th STREET & LEHIGH AVENUE · PHILADELPHIA 32, PA.

Represented on the West Coast by Dan E. Charles Agency, 618 Jones Building, 1331 Third Avenue, Seattle 1, Wash.

***Above**—Moore & White 4-drum board winder equipped with Moore & White shear-cut slitters*

***Above**—Moore & White 4-drum winder equipped with automatic roll ejectors*

CUSTOM-BUILT MACHINES FOR MAKERS OF PAPER AND PAPERBOARD

To Save Money on Speed Reducers

BUY PACIFIC-WESTERN *STOCK DESIGNS*

You can lower your plant-equipment costs by selecting a stock-design speed reducer for new or replacement purposes. You also save delivery time. A wide variety of types of Pacific-Western speed reducers—covering most industrial applications—is available either from stock or with minimum manufacturing lead time. Ask your nearest Pacific-Western sales engineer to show you how you can avoid the cost and delay of special tooling or engineering *where it is not necessary.*

This single-reduction, parallel-shaft herringbone reducer, shown with cover off, is one of the Pacific-Western stock designs available in many standard stock ratios and in a wide range of horsepower capacities.

STOCK-DESIGN REDUCERS

- ★ Single, Double, and Triple Reductions
- ★ Parallel-Shaft Reducers
- ★ Right-Angle Reducers
- ★ Vertical Reducers
- ★ Motorized Reducers
- ★ Cone-Drive Reducers
- ★ Speed Increasers (High-Speed Units)

NON-STOCK DESIGNS

- ★ Pacific-Western special geared transmissions include types and sizes for every application.

The mechanical features of this reducer represent the experience of fifty years of gear-making design and production. You will find tested and proved quality in every speed reducer in the Pacific-Western line. Complete mechanical details and specifications are given in Bulletin 4802, "Herringbone Speed Reducers." Use the convenient coupon to obtain your complimentary copy of this 48-page book.

Use Handy Coupon for Quick Information

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5131

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Manufacturers of PACIFIC-WESTERN Gear Products
Plants: Seattle, San Francisco, Lynwood, Houston, Portland, Denver, Vancouver, B.C.
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Attach this coupon to your letterhead and mail to your nearest Pacific-Western plant or office.

WESTERN GEAR WORKS

Gentlemen: Please send me the information requested by return mail.

☐ Send copy of Herringbone Speed Reducer catalog.

☐ Send complete information on type of speed reducer listed below:

NAME _____

TITLE _____

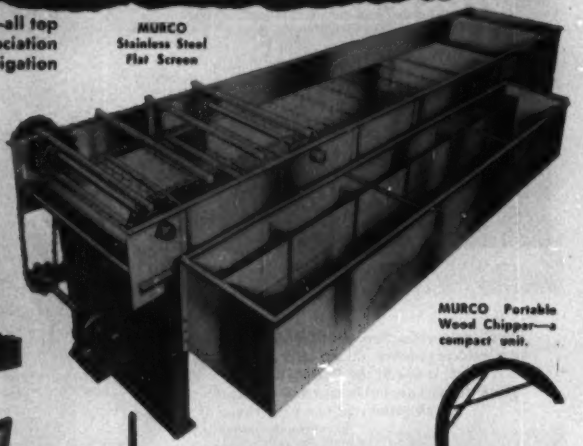
A SPECIALIZED SERVICE TO THE

ENGINEERING • PATTERN MAKING • MODERN MACHINE SHOP AND FOUNDRY OPERATIONS

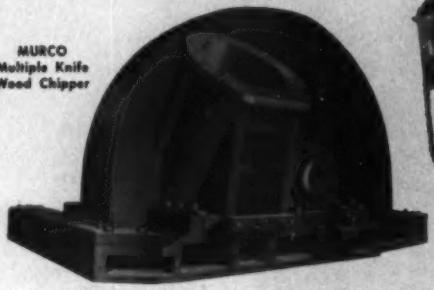
BACKED BY OVER 65 YEARS EXPERIENCE

To the paper industry we offer a complete service including engineering, pattern making, modern machine shop facilities and foundry operations—all top quality because of our over 65 years' close association with the needs of paper manufacturers. No obligation for complete details and engineering recommendations.

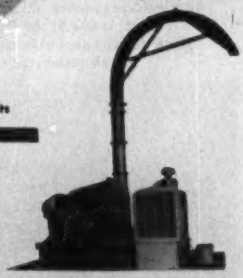
MURCO Stainless Steel Flat Screen



MURCO Multiple Knife Wood Chipper



MURCO Portable Wood Chipper—a compact unit.

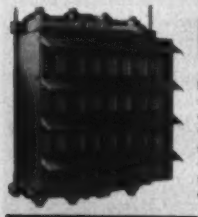


MURCO Windershafts

MURCO Quick Opening Gate Valves

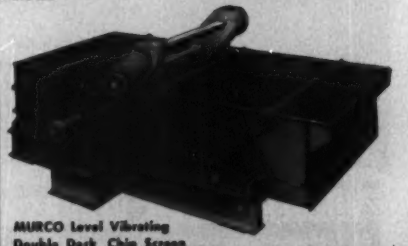
Stainless Steel Pipes and Fittings

MURCO Chip Crusher



GRID UNIT HEATERS AND BLAST COILS

For heating, drying and processing equipment, GRID cast iron construction assures trouble-free service . . . one piece construction high test cast iron heating sections . . . no soldered, brazed or welded sections . . . no electrolysis to cause corrosions, breakdowns, leaks or heating failures . . . may be used on steam pressures up to 250 lbs. Send for catalog, engineering data and capacity tables.



MURCO Level Vibrating Double Deck Chip Screen

D. J. MURRAY MANUFACTURING CO.

Manufacturers Since 1883

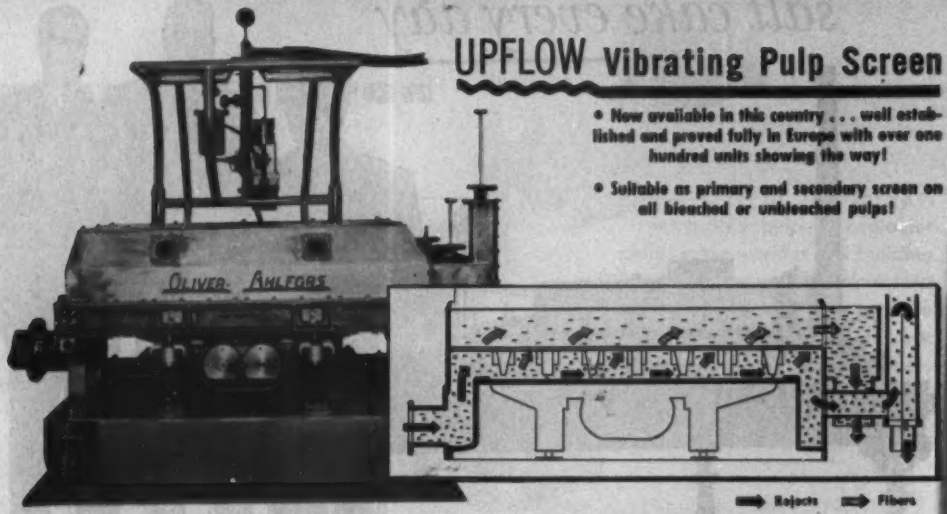
WAUSAU WISCONSIN

Announcing!

OLIVER-AHLFORS

UPFLOW Vibrating Pulp Screen

- Now available in this country . . . well established and proved fully in Europe with over one hundred units showing the way!
- Suitable as primary and secondary screen on all bleached or unbleached pulps!



THE Oliver-Ahlfors Screen operates with an upward rather than downward flow of the pulp. This unique action provides the following advantages:

1 . . . high screening capacities because slotted plate screen doesn't clog.

2 . . . knots, dirt and other rejects drop down and away from the screening surface rather than onto it.

3 . . . fast, gentle, easily adjusted vibrations.

4 . . . rejects are constantly discharged at a controllable rate.

5 . . . can operate at much higher consistencies than normal flat screens; less power required.

6 . . . smaller floor area per ton handled.

These, briefly, are a few highlights of the Oliver-Ahlfors Screen of which the upward flow of pulp and the dropping away of rejects are the outstanding features. There are other advantages—operational and structural—very much worth studying. We'll be glad to send full information on request.

New York 18 — 33 W. 42nd St. Chicago 1 — 221 N. LaSalle St.
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Oliver United Filters Inc.
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INDIA
Derr-Oliver (India) Ltd., Bombay

EUROPE & NORTH AFRICA
Derr-Oliver S. A. Brussels
Derr-Oliver S.N.a.R.L. Paris
Derr g.m.b.h. Wiesbaden (16)
Derr-Oliver Co., Ltd., London, S.W. 1
Derr-Oliver S.a.R.L. Milano
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AUSTRALIA
Hebert Duff Pty., Ltd.
Melbourne

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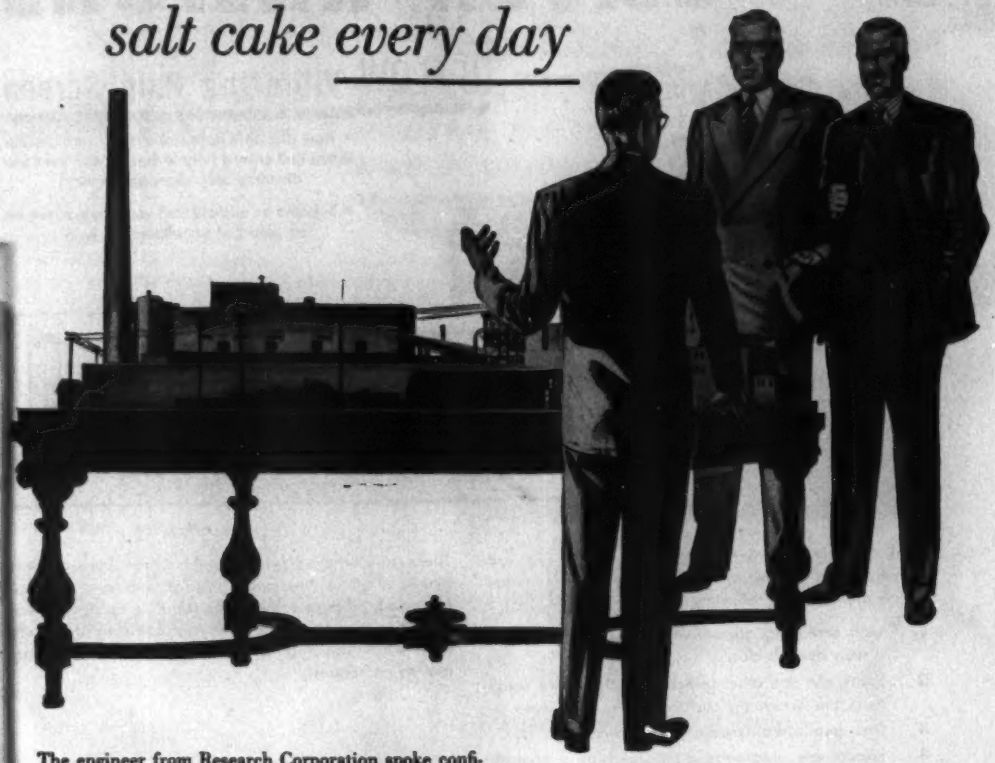
A RESEARCH CORPORATION COTTRELL

will save you $1000 to $1500 worth of salt cake every day



The engineer from Research Corporation spoke confidently. He had studied the equipment layout, and noted that the mill had a capacity of 1,000 tons of pulp per day. From his experience and specialized knowledge he knew that he could safely anticipate a minimum recovery of 100 pounds of salt cake for each ton of pulp produced—total: 50 tons of salt cake per day—value: $1,000.00 to $1,500.00 per day dependent upon salt cake cost prevailing at the plant.

Performance like this is the result of over 35 years of experience combined with careful engineering appraisal, attention to details and a remarkably efficient method. These, plus equipment which gives recoveries of 90 to 99%, are responsible for outstanding records of recovery.

If you are losing your chemicals through the stack in a soda or sulphate mill investigate the Research Corporation Precipitator.

RC-108

Research Corporation Installations

47 CARBON BLACK PLANTS
200 METALLURGICAL INSTALLATIONS
203 ACID PLANTS • 34 PAPER MILLS
262 DETARRING INSTALLATIONS
195 POWER STATIONS
71 STEEL PLANTS • 95 OIL REFINERIES
AND MISCELLANEOUS INSTALLATIONS

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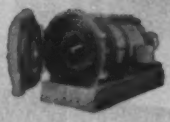
405 Lexington Avenue, New York 17, N. Y.
122 South Michigan Avenue, Chicago 3, Illinois

to solve SEMI-CHEMICAL refining problems economically –

a large South-Eastern Mill uses

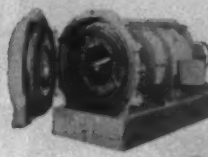
Sprout-Waldron Refiners

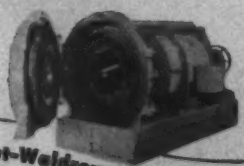


One of the largest integrated pulp-to-container plants in the world is now building a 300 ton per day semi-chemical pulp mill, expandable to 400 tons to make .009 corrugating board for its own use. 9 Sprout-Waldron Refiners will do the pulping.

Here's why S-W Refiners are preferred by mills throughout the United States and Canada:

- Flexibility of operation
- High capacity
- High pulp quality
- Ease of feeding
- Low capital investment
- Low maintenance costs
- Low plate costs per ton of pulp





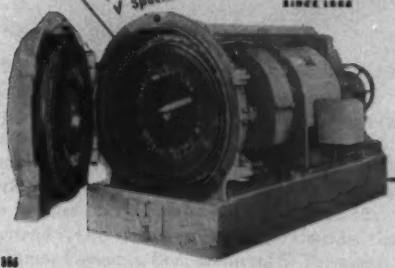
The Sprout-Waldron 36-2 Refiner is THE SEMI-CHEMICAL PULP REFINER
It's the top producer of semi-chemical pulp today

You can pinpoint exact pulp test requirements with the Sprout-Waldron Refiner.

List of Applications

- √ Semi-chemical Pulping (Bleached-Unbleached)
- √ Pre-Refining—High Yield hot brown stock
- √ Kraft—Groundwood—Sulphite Knots & Screenings
- √ Secondary Refining of Asplund Stock
- √ Bleached Soda Pulp
- √ Insulation Board Stock
- √ Hardboard Stock
- √ Flooring Felt
- √ Special Applications

SPROUT WALDRON SINCE 1848



See what others are doing . . . your copy of our special file on successful semi-chemical pulp mills is reserved for you. Write Sprout, Waldron & Co., Inc., 59 Waldron St., Muncy, Pa.

Sprout-Waldron
Manufacturing Engineers

Stop costly down-time

from CALENDAR DRIVE FAILURES

If calendar drive failures are slowing your production and eating profits, take a good look at the Manchester Calendar Drive.

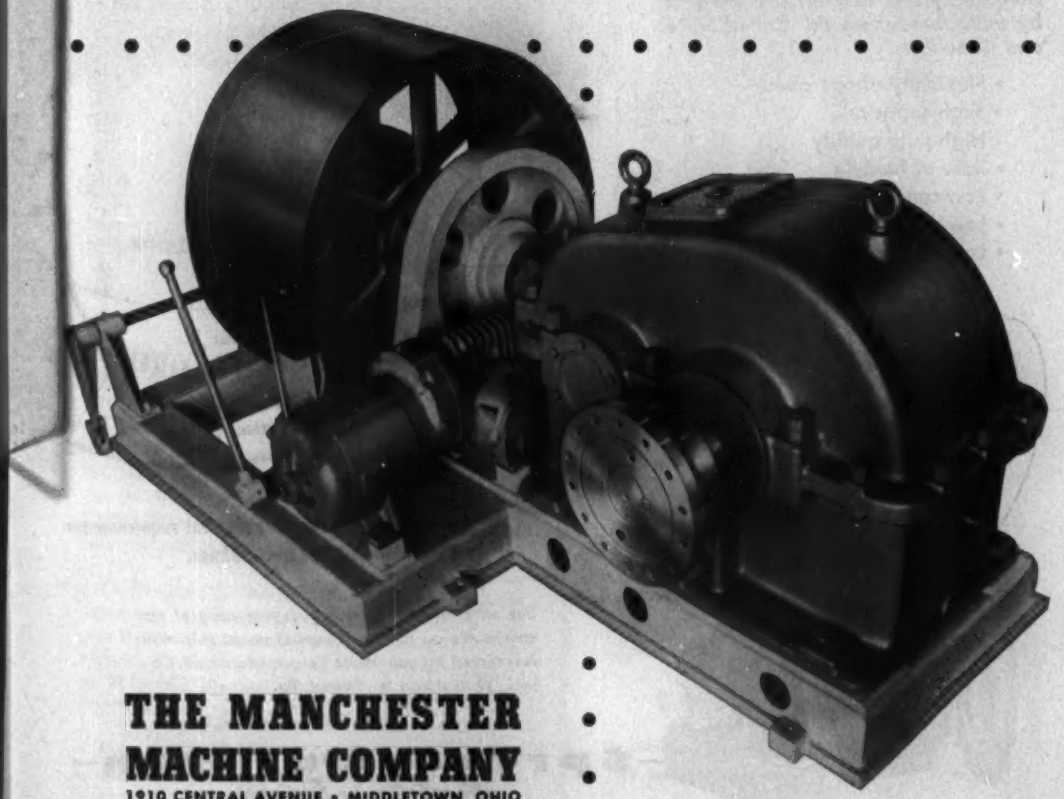
Your engineers and production men will stamp their OK on these features:

1. **Smooth flow of power**
2. **Ample sized gears**
3. **Rugged *over-capacity* clutch**
4. **Back-up inching motor interlocked with clutch**
5. **Fewest possible working parts**
6. **Low maintenance**

You don't have to worry about the severest strain or heaviest overload with a Manchester. This calendar drive can take it — for years. Write for more information, applied to your individual requirements.

A Few Other Manchester Products

DRUM WINDERS • POPE TYPE REELS • SLEE PRESSES • RUBBER-COVERED DRILLED SUCTION DRUM ROLLS • DRILLED SUCTION COUCH ROLLS • SHAKE MOTIONS • PAPER MACHINE DRIVES CYLINDER MOULDS • COMPLETE FOURDRINIER • ROLL GRINDING



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SPECIALISTS IN PAPER MILL MACHINERY AND COMPLETE REPAIR SERVICE

TIMELY HELP FROM TITANOX RESEARCH:

a swing to PIGMENTED light weight papers

HELPS EXTEND PAPER-MAKING SUPPLIES

Pigmentation with titanium dioxide makes possible the manufacture of light weight papers with no increase in show-through, no loss of brightness or opacity. This type of processing enables you to increase the usefulness of your paper-making raw materials—a worthwhile consideration in times of tight supply.

Many years of research in the pigmentation of light weight papers are reflected in today's TITANOX titanium dioxide pigments. TITANOX-A, the water-dispersible titanium dioxide, and the rutile-calcium pigment, TITANOX-RCHT, whiten, brighten and opacify paper by addition to the coating or directly to the beater. Their optimum particle size insures easy mixing and complete dispersion. These qualities are vital to light weight paper pigmentation.

Whatever type of paper you produce, if you need whiteness, brightness or opacity—our Technical Service Department is always available to help you get the maximum out of your TITANOX pigment supply. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments, Ltd., Montreal 2; Toronto 1.

TITANOX

the brightest name in pigments

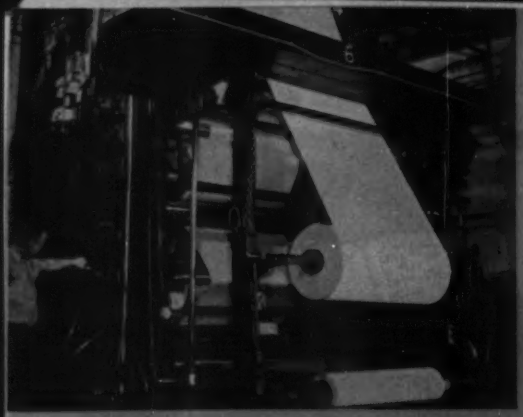
TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

SUN LUBRICANTS UP PRODUCTION, LOWER COSTS IN 4 PAPER MILLS

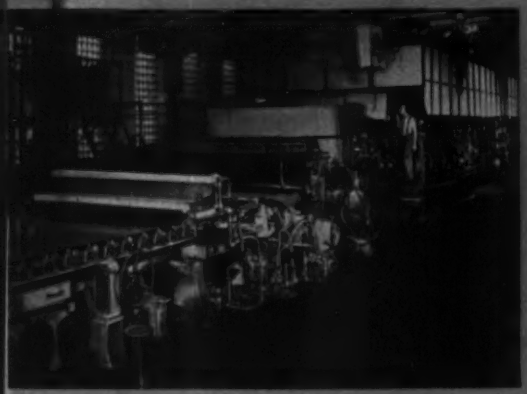
Changing to Sun lubricants increased production efficiency and effected substantial savings in all the mills in which the accompanying pictures were taken. Such results are typical in the growing number of mills using Sun "Job Proved" lubricants and the technical service that goes with them.

In the picture captions, the problems and their solutions have had to be greatly condensed. If you or your production and maintenance personnel would like all the facts, and if you are located in eastern U.S. or Canada, we'd be glad to have a Sun technical representative call. Just write Department PT-7.



DECREASED BEARING AND OIL COST. A Sun lubricant saved this mill $2,900 in two years. Supercalender bearing failures used to average five a month, because the former oil could not stand the temperature and operating loads.

BEARING SCORING REDUCED. This mill, one of the biggest, switched to a Sunvis Oil to minimize scoring of drier roll bearings. The same Sunvis Oil was recently specified for a brand-new machine—one of the fastest producers in the world.



10 YEARS WITHOUT A BEARING FAILURE. That is the achievement record of the Sun oil which lubricates this Fourdrinier—one of six which operate constantly to turn out 180,000 feet of fine offset and specialty paper every hour.

80% LESS GREASE NEEDED. This and other advantages were gained by switching to a Sun bearing grease for the Fourdrinier. The costly grease formerly in use would not stay in the wet-end bearings under grueling continuous duty.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO

Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL.
Wednesday, July 11, 1951.

What of the Morrow?

The mill holiday season finds the industry poised in expectancy. On the answers to three leading questions hangs all the immediate future.

What will happen to world demand for raw materials and the finished product in the wake of a Korean truce, is probably No. 1 question. And closely enough related to that to be two-fold No. 1a is: How deep will the dip in consumer demand for papers, boards and products go before demands of the Defense Program take up the slack? How high shall be build stocks of pulp, waste papers, rags and other raw materials?

General attention is centered on the Congressional battle about the extent of controls. Will prices of pulpwoods, pulps, papers and boards be frozen at current levels after July 31, when the interim order expires? That's the second major question.

No. 3 concerns M-72, NPA Chemical Wood Pulp order. This is the interim period when the machinery of the order is getting into gear. How soon can we get some of the reserve pulp stocks at $132.50, some mills are asking?

Sideruns VS Kraft Cuts

Also being asked is: Where is the line drawn between unbleached kraft waste paper grades at $150/165 and sideruns of unbleached sulfate at $132.50? Without a ceiling on waste papers, the definition within the price order (CPR 49) has a two-way stretch. By the trade, it seems accepted that kraft cuts from conversion operations are waste paper grades; paper machine rejects are sideruns at $132.50. By inference, it is expected that the tonnages of kraft paper rejects which have been available in considerable volume for some months will disappear from the market.

Waste Papers Firm

In this interim period, waste paper prices are firm. Low bulkies are being taken up by the mills at strong prices, and pulp substitutes are being sought at prices known to be above GCPR level. There is no possibility of a price ceiling order now until after July 31, when the prospects are that it will be unnecessary.

Effect on Pulp Price

Conceivable effect of a Korean truce is that world demand for wood pulp will ease and that prices will decline with general commodities, which already have begun the slide. Take cotton, for example, which has a ceiling of 45 cents. New cotton deliveries for October are selling at 36 cents with a record crop in sight. Commodity market students see a record price drop ahead, also.

Since producer and consumer stocks of wood pulp are at lowest levels, no appreciable dip in demand for pulp will come until stocks are more healthy. (U. S. consumers are limited by M-72 to 45-day supply of current quarterly consumption.)

The industry generally is cautious about the future. Mill order backlogs of paper still are high, but daily average production had begun to ease as far back as May, as a study of *Table I* will indicate. Ahead are the traditionally dull months of July and August. Wholesaler and consumer inventories are bulging — with the exception probably of kraft wrapping and corrugateds. Gone the need for further stockpiling with the hope of peace ahead, merchants, converters and consumers are likely to be anxious to liquidate their heavy stocks. New orders to mills will suffer, backlogs will diminish. The rate at which these inventories are cut back will have a telling effect on the prices of paper and pulps and other raw materials.

Market Normalcy Coming?

Industry opinion is that, barring any new international explosion, a shakedown to more normal conditions than the market has known since the Korean incident is just ahead.

In fine and printing papers, a much deeper dip than the usual July-August low will permit the Government to buy its needs, and then some.

General retail buying will lag further. Except for being teased into activity by bargain and clearance sales, it probably will take a long summer holiday. Thus requirements for tissues and wrappings and gummed tapes will be lighter, and these stocks will get a much-needed chance to build to more healthy levels.

Under these conditions, raw material prices would respond rapidly to the law of supply and demand. Wood pulp supply would be abundant, and prices well below CPR 49 ceilings. Waste paper substitute grades would assume their relative values, and cotton cuttings be much lower. Wanted chemicals also should be in easier supply.

To Be or Not To Be?

Should a Korean truce not result from current negotiations, the net effect probably will be an angry American public that will accept the Administration's control program with less gripes, and will give impetus to Defense Planning.

Currently the industry is watching the daily Washington battle against rollbacks with much interest, particularly in pulp circles. Prices of paper and products under CPR 22 also are involved.

Defense Program Requirements

A sharp increase in coarse paper and board demands for the Defense Program is due early in Fall, with or without a truce, with or without a rollback. The industry sees these requirements and consumer demand being met with ease under existing conditions.

Materials

Chlorine.— Supplies continue generally tight, in some cases acutely so. No early easing of the condition is expected before new production gets underway. A summer dip in industry consumption would mean little to general demand pattern as consumer stocks are at low-ebb. Also a factor is continuous growth in uses for the chemical. The supply situation for paper mills could worsen since most pulp available from integrated mills under the M-72 set-side order will be unbleached grades.

Rosin.— A sharp slump in rosin prices and a weak market condition followed the announcement of the proposed Korean truce. Buyers withdrew from the market to await developments, and gum rosins dropped from $9.16 to $8.25, with further weakening seen likely.

TABLE I
May Paper Production

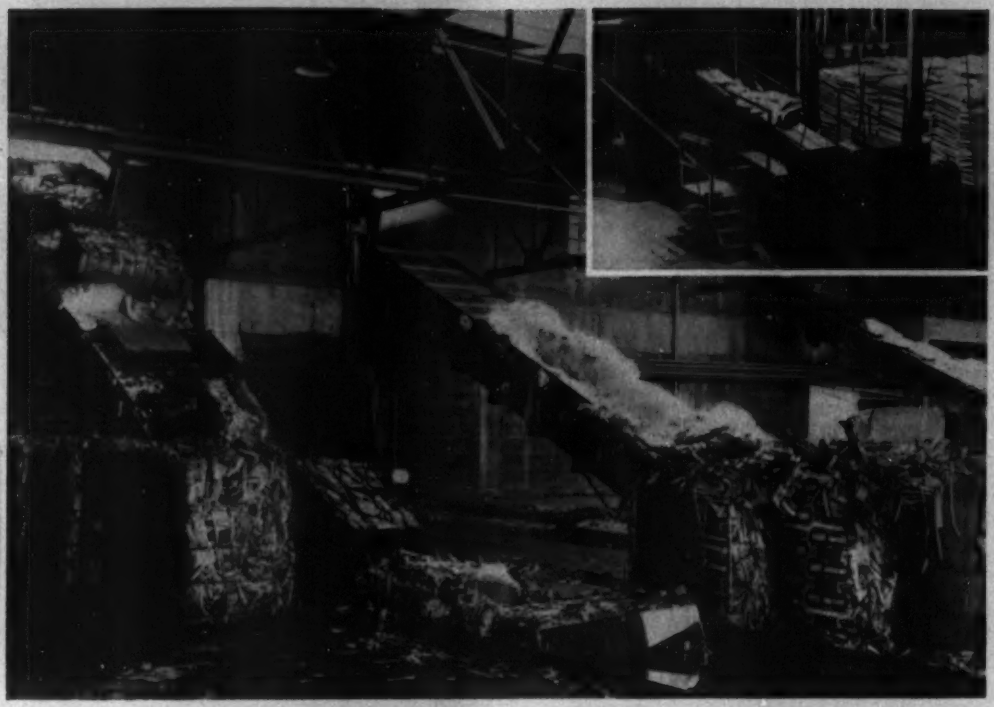
	Production Tons	% Changes in Daily Avg. Production: May 1951 Compared with April 1951	May 1951 Compared with May 1950
A. Printing Papers	313,000	— 2.2	+13.7
B. Fine Papers	117,000	— 4.3	+11.0
C. Coarse Papers	307,000	— 0.3	+ 5.3
D. Tissue Papers	133,000	— 7.6	+23.2
E. Miscellaneous Papers	52,000	+ 2.0	+45.6
F. Total, Groups A-E	921,000	— 2.4	+13.0

May, 1951 had two more working days than April, 1951 and the same number as May, 1950.
Source: APPA Monthly Statistical Summary.

Paperboard Production (Tons)*

	June 30 1951	June 23 1951	July 1 1950	Month of June
Production	244,242	244,969	211,058	977,314
New Orders	221,045	173,687	220,204	873,859
Unfilled Orders	547,963	572,952	394,110	547,963

*Source: NPA.



How to Hike Hydrapulper Output

Install a traveling conveyor ahead of your Hydrapulper. Do this and you will be able to:

Deliver stock to the tub faster. Tumble stock overboard at more even pace, thereby obtaining a more uniform pulping job.

Effect worthwhile labor saving.

Another good spot for a conveyor is between the unloading platform and storage.

Five years ago traveling stock conveyors in paper mills were virtually unknown. Today there are hundreds of them on the job and all rapidly amortising their cost.

SHARTLE

Any design preferred
Any length required
Contact Shartle

SHARTLE BROTHERS MACHINE CO.
MIDDLETOWN, OHIO

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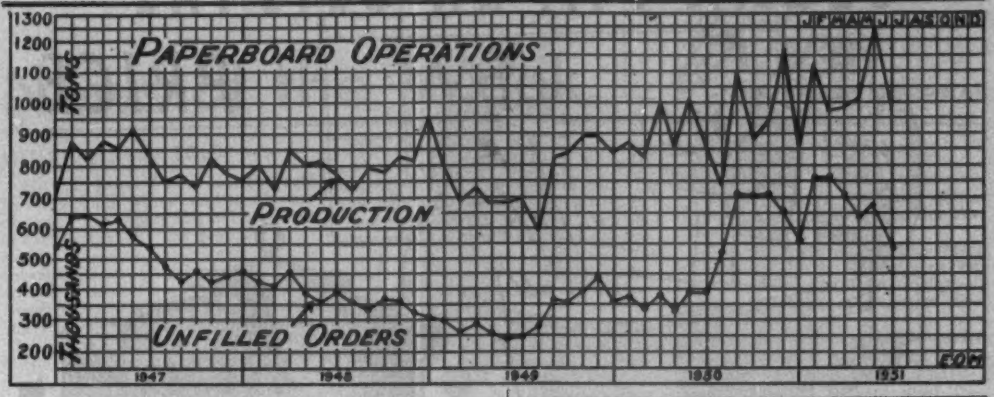
Western Sales Office: Mayer Bldg., Portland, Oregon • *Southern Sales Office:* 937 Coventry Road, Decatur, Georgia
Associate: THE ALEXANDER FLECK LTD., Ottawa, Ont. • *Subsidiary:* B-C INTERNATIONAL LTD., Grosvenor House, Haymarket, London, S. W. 1, Eng.

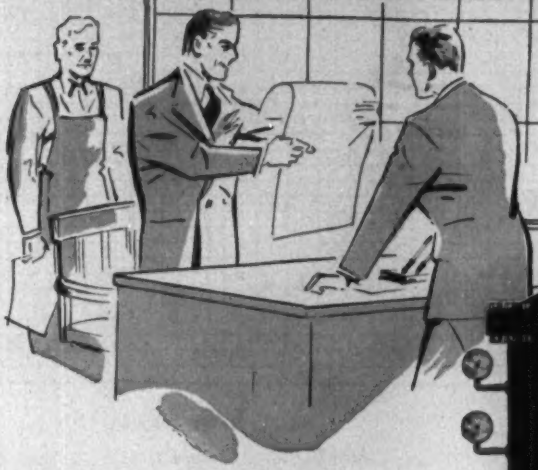


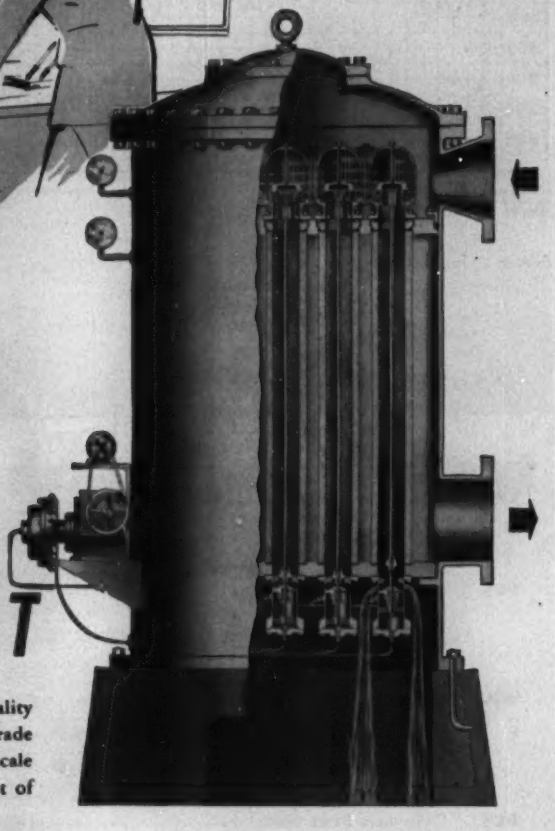
Brief of Important Figures

Source		WEEK ENDING June 30, '51	June 2, '51	July 1, '50
APPA	Paper Production Percent Capacity[a]	95.4	100.1	97.7
	Unbl. Kraft Paper Production Percent	102.3	103.3	97.9
NPA	Paperboard Operating Ratio Percent Inch Hours	103	100	94
		May 1951	**Apr. 1951x**	**May 1950**
APPA	Paper Production[a] (Except Newsprint and Building Papers) ..... Tons	921,000	874,087	842,500
	New Orders ..... Tons	904,000	906,748	836,000
	Unfilled Orders ..... Tons	996,500	1,016,525	535,065
	Shipments ..... Tons	923,000	875,577	842,000
		June 1951	**[4]May 1951**	**June 1950**
NPA	Paperboard Production ..... Tons	977,214	1,251,633	846,030
	New Orders ..... Tons	873,807	1,264,120	855,016
	Unfilled Orders ..... Tons	547,963	658,722	394,110
	Our Customers Activities Index[1]	**Latest Mo.[e]**	**Previous Mo.[e]**	**Year Ago[e]**
FRS	Manufactures Total Index	231	230	197
	Durable Mfg. Index	275	275	221
	Nondurable Mfg. Index	195	194	178
	Chemical Products Index	299	296	253
	Mfg. Food Products Index	154	150	150
	Printing and Publishing Index	185	178	174
ODC	Magazine Advg.-Printer's Ink Index	338	343	327
	Retail Sales Combined Adjusted Index	341.1	342.3	309.8
	Drug Index	232.1	241.2	224.6
	General Merchandise Group Index	327.5	316.6	293.0
	Grocery and Combination Index	431.0	432.7	378.8
	Prices Index			
BLS	Consumers Price Index[3]	184.6	184.5	168.5
	Wholesale all Commodities[3]	183.5	184.0	152.9
	Wholesale Foods[3]	185.7	186.6	155.3
	Commodities other than Farm Products and Foods[3]	172.1	172.4	146.4
	Wholesale Pulp and Paper[3]	196.2	196.3	155.4
	Purchasing Power of Dollar, Consumers Prices[1]	54.2	54.2	59.3
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	429.4	433.6	337.2
	Unemployment Compensation Initial Claims (M)	983	719	1,543
	Miscellaneous Carloadings-Thousands of Cars	1,580	1,979	1,434
	Electric Output (Million KW hr.)	34,431	36,172	30,191
PTJ	Average 32 P & P Common Stocks as of July 7	$37.75	$38.49	$31.39

[1] 1935-39=100 Unadjusted Index
[3] 1926=100
[a] New 4-7 day basis.
[4] For Five Weeks.
[a] For details see APPA Monthly Statistical Summary—April 1951 Estimated Figures
[e] Latest Month Available on Request
x Revised figures.

CLEAN PAPER GETS THE PRICE





ADAMS

WATER FILTRATION GETS THE *DIRT*

In kraft or tissue, book or newsprint—water quality is as critical as chip quality. No matter what grade of pulp or paper you make, sand, grit and pipe scale are expensive when they keep your product out of the top price brackets.

Water filtration with the fully automatic Adams Poro-Screen or Poro-Stone Filter takes out price-lowering impurities *before* they become part of the stock. Continuous backwashing effectively prevents clogging of filter elements—avoids costly, cumbersome cleaning operations.

Remember—in its early stages your product is about 98% water, and most water-borne impurities stay with the stock.

Find out what Adams filtration has done in situations like yours. Write for the new 20 page booklet on water filtration in the Pulp and Paper Industry, Bulletin No. 691.

R. P. ADAMS COMPANY, INC.

231 EAST PARK DRIVE, BUFFALO 17, N. Y.

News of the Week

Paper TRADE JOURNAL

LITTLE FALLS MILL SOLD

The St. Regis Paper Co. has sold its Little Falls, Minn., mill to a group of seven newspapers and a New York newsprint broker. The purchasers include: Tulsa Tribune, Tulsa World, Cleveland News, Cleveland Plain Dealer, San Antonio Express, San Antonio News, Charleston (W. Va.) Gazette, and Walter D. Peek, newsprint broker. The selling price was approximately $1,500,000 including inventory.

It is reported that the mill's present contracts will prohibit the manufacture of newsprint only, but the purchasers expect some relief from the critical shortage which now exists among newspaper publishers.

PLAN MILL FOR LOUISIANA

The Louisiana Press Assn. has appointed a Newsprint Mill Committee for the establishment of a mill in Louisiana comprising Clarence E. Faulk, Ruston Leader, chairman; John F. Tims, New Orleans Times-Picayune; Harry B. Squiers, Lafayette Advertiser.

B. C. SETS PRODUCTION RECORD

Pulp and paper production in British Columbia during 1950 reached a valuation of $78,739,573 as compared with $68,482,241 for 1949, according to figures just released by Hon. E. T. Kenney, Minister of Lands and Forests for British Columbia. These figures are also well over the 10-year average, which showed a production value of $46,510,704.

Pulpwood exported in 1950 was valued at $741,128. In 1949 pulpwood exports reached a valuation of $139,200, and the 10-year average was $103,373.

Paper production during the year reached an all-time high of 477,628 tons, of which 388,191 tons were newsprint and 89,437 tons of other types of paper. The previous record for British Columbia was established a year earlier, when 83,927 tons of other papers and 378,355 tons of newsprint were produced.

BROWN TO PRODUCE SULPHUR

Brown Co. plans to install Dorr FluoSolids system for the roasting of iron sulphide concentrates. It is expected all equipment will be installed and in operation within ten months.

The capacity of the plant is the sulphur equivalent of 9,000 tons per year in the form of SO_3 gas.

The concentrates will be furnished under a contract with the Vermont Copper Co. of South Strafford, Vt., and will utilize the tailings after the copper concentrate has been taken off. This will be accomplished by the floatation process. As the mine is approximately 100 miles from Berlin, N. H., shipment will be made on the Boston & Maine Railroad.

This installation will assure Brown Co. of ample sulphur in spite of the current shortage of elemental sulphur and it is expected that the costs will compare very favorably with present costs of elemental sulphur shipped from Texas and Louisiana.

New Feature

"European Spotlight" is started in this issue. It will be a brief digest of important facts concerning Pulp & Paper as seen by a leading foreign correspondent.

INCREASE BOOK PAPER CAPACITY

OTTAWA—Three companies, Howard Smith Paper Mills, Provincial Paper Ltd., and E. B. Eddy Co., are increasing their productive capacity for making book, magazine and similar paper by 43% so that the increase in such production will be 65,000 tons to a total of 215,000 tons a year compared with 1950 output of 150,000 short tons.

It is expected that this program for each company will be completed next year or at least early in 1953.

In 1950, total production of fine papers in Canada reached 234,936 tons, with the production of approximately 85,000 tons in grades other than book, magazine and similar papers.

U. of M. NAMES EXEC. COM.

ORONO, Me.—A nine-member executive committee "which will be responsible for the operation of The University of Maine Pulp and Paper Foundation" has been approved by the trustees of the university.

Chairman of the committee is J. L. Ober, vice-president of the Scott Paper Co., Chester, Pa.

Other committee officers are as follows: W. E. Parsons, president, Keyes Fibre Co., Waterville, and F. A. Soderberg, manager, Industrial Division, General Dyestuff Corp., New York City, vice-chairmen; J. B. Calkin, director of the Department of Industrial Cooperation, University of Maine, secretary.

MAY BUILD NEWSPRINT MILL

Powell River Co., Ltd., Vancouver, B. C., may build a newsprint mill at Kitimat, site of a new plant for Aluminum Co. of Canada.

Alcan, in cooperation with Powell, will make a survey of the area with the idea of creating a fully integrated industry to utilize all available wood species in that area.

Powell has a billion and a quarter feet of timber in the Kitimat Valley and more on the Queen Charlotte Islands, a short distance west from Kitimat. It is understood it could also utilize timber from the huge island area which will be partly flooded from the aluminum power project.

Kitimat is on the coast, a short distance below Prince Rupert near the southern tip of Alaska.

CRYSTAL TISSUE EXPANDS

A $75,000 plant addition has been completed at The Crystal Tissue Co., Middletown, Ohio. The building will be used to expand the manufacturing and converting operations of the waxing company. It adjoins the main tissue mill and will increase storage and plant space about 60 percent for the waxing company and shipping facilities about 50 percent for the tissue company.

BRUNSWICK BUYS PROPERTY

BRUNSWICK, Ga. — The Brunswick Pulp & Paper Co. has purchased 250 acres of land from the city of Brunswick for $25,000 to provide for future expansion. The land is adjacent to the company's plant, where a multi-million dollar expansion program is now under way. The newly-acquired tract is largely marsh land which would have to be dredged, drained and filled in before use for manufacturing or storage purposes.

KIECKHEFER TO BUILD PLANT

JACKSONVILLE, Fla.—Kieckhefer Container Co., Camden, N. J., has awarded a contract to the S. S. Jacobs Co., Jacksonville, for construction of a kraft conversion factory on North Pearl street here.

The new building, of reinforced concrete design, will contain approximately 25,000 square feet of floor area and is expected to cost close to $200,000. It is being designed by Marsh and Saxelbye, local architects.

CUSTOMS COURT CASES

Wrapping paper containing 10 percent material other than kraft pulp, classified by Vermont officials as wrapping paper other than kraft at 25 percent, is claimed by the importer to be dutiable as kraft wrapping at 20 percent in a protest filed with the United States Customs Court, according to a report issued by Warren B. Bullock, manager of the Import Committee of the American Paper Industry.

Other court cases filed by importers involve paper claimed to be duty free as paper stock, held by officials at Malone to be dutiable as paper not specially provided for, and fabricated paperboard imported at Pittsburgh, claimed to be dutiable as test container board at 10 percent, held by officials to be dutiable as a manufacture of paper at 17½ percent.

Vinyl coated paper for inner soles of shoes has been classified by Customs officials as embossed coated paper at 4½ cents per pound plus 10 percent, and not as shoe board at 10 percent. Sewer pipe imported at San Francisco, composed of saturated paper, was classified for duty at 17½ percent as a manufacture of paper. Paperboard imported from Canada claimed to be dutiable as fiberboard at 5 percent was held to be dutiable as test container board at 10 percent.

Other cases before Customs officials include asphalted paperboard claimed to be insulating material, the character of board imported in Minnesota as processed paperboard, but valued at $1 per pound and shoe board imported through Vermont, believed to have been undervalued.

NOW MILLER PACKAGING

LEXINGTON, Ky. — Lexington Paper Co. has filed a charter amendment with the Secretary of State changing the corporate name of the firm to the Miller Packaging Co. Headquarters have been moved from Lexington to Louisville.

FLORIDA VALUES PULP & PAPER

JACKSONVILLE, Fla. — The value of pulp and paper industry products produced in Florida last year approximated $165 million, according to a survey conducted by the Florida State Chamber of Commerce.

The seven pulp and paper plants operating in the state produced 1,320,000 tons of pulp and paid around $30 million to get the work done.

The payrolls are 14 percent of Florida's total manufacturing payrolls. Some 4,000 employes were in the mills and 6,700 in the woods.

The pulp manufactured by the mills is used in making paper and paperboard. More than two million cords of pulpwood were used in producing the pulp and more than half of it came from Florida forests.

"Extensive reforestation activities of the mills results annually in inestimable benefits. Plans are now underway for extension of the Florida industry to increase production by one-third by the end of 1952," the Chamber's report stated.

PEOPLE

GAIR CO. OF CANADA, LTD. has elected the following, pictured above, upper left—J. Stanley Babbitt, director and vice-president; upper right—Alpine L. Mitchell, director and vice-president; lower left—David H. Ross, president and general manager; lower right—W. George Cowan, director, vice-president and assistant to the president.

JOSEPH HILLWOOD has been appointed purchasing agent, Brown Corp., with headquarters at La Tuque, Quebec, replacing A. R. LAMBERT, who resigned.

GEORGE H. PRINGLE has been appointed chief engineer of The Mead Corp. He will direct the general engineering department, which is located in Chillicothe, Ohio. J. B. GOUGH, who was formerly chief engineer, will continue as consulting engineer in an advisory capacity to Mr. Pringle and the management.

DAVID A. CAIRNS has been elected vice-president of Richard Bauer & Co., Inc., as of July 1. Mr. Cairns has been with the firm since 1947. Prior to that time, he was connected for 23 years with the Allied Paper Mills of Kalamazoo, Mich., and was in charge of their New York office.

RALPH D. MAIN and ROBERT FAEGRE have been elected vice-presidents and HADLAI A. HULL, secretary-treasurer of the Minnesota and Ontario Paper Co.

Mr. Main joined Mando in 1921, and from 1941 to 1949 served as secretary-treasurer. In the past two years he has been treasurer.

Robert Faegre has been with the company since 1938 when he served as a special representative for the Insulite Co. in Denmark. He filled various sales capacities and subsequently served in the U. S. Navy as a Supply Corps officer primarily concerned with paper and paper products procurement, being released from active duty with the rank of Lieutenant. Upon return to the company he served as assistant sales manager, first in the Insulite division and later in the paper sales division. He has been paper sales manager since 1949.

Mr. Hull joined Mando in 1946 as assistant secretary, following release from active duty with the U. S. Navy. He has been secretary of Mando since 1949.

ROBYN A. CAMPBELL has been appointed sales manager, Paper Division, and JAMES V. OTNESS, assistant sales manager, Paper Division, of the Minnesota and Ontario Paper Co.

Mr. Campbell, formerly assistant sales manager responsible for the field sales organization, will now have immediate supervision over the Paper Sales Division. He succeeds Mr. Faegre who will, however, retain overall responsibility for paper sales activities. Mr. Otness, who has been manager of the Chicago Sales office, is transferred to the Minneapolis headquarters office where he will succeed Mr. Campbell.

BRUCE CRANE of Crane & Co., Dalton; HARRY E. RIGGS of Strathmore Paper Co., West Springfield and R. H. MORRILL of Chemical Paper Manufacturing Co., Holyoke, have been appointed members of the OPS advisory committee on writing paper and other fine papers.

CHARLES C. CATLIN has been appointed to the newly created position of general manager of Allied Paper Bag Corp. of Baltimore. Mr. Catlin will be in charge of all phases of the company's operations.

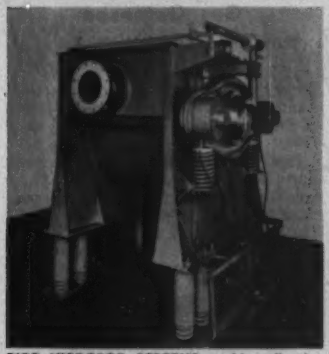
S. E. WILLIAMS, formerly resident manager of the St. Lawrence Paper Mills Co., Ltd., Three Rivers, Que., has been appointed general manager of the St. Lawrence Paper Mills Co., Ltd., and its subsidiary, Lake St. John Power & Paper Co., Ltd. He succeeds A. GEORGE JACQUES who has resigned due to ill health.

The Keep Green program of forest fire prevention, started in 1941, now operates in 30 states.

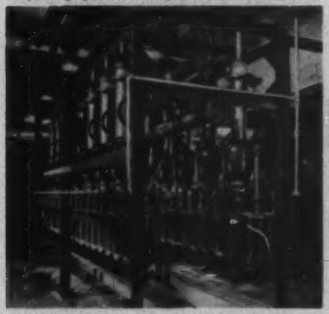
Trees are a crop—like wheat or cotton—on more than 3,000 Tree Farms in this country.

BIRD SCREENS are universally identified with continuous production at maximum paper machine speed. Ninety per cent of all the paper made in North America passes through Bird Screens.

BIRD JONSSON SCREENS handle big tonnages of high consistency pulp with minimum fibre loss. Screening efficiency is remarkably high; screening cost per ton is low.



BIRD VIBROTOR SCREENS combine vibration and rotation to handle 50 to 80 tons of pulp per day through .012" plates at 1.3 to 1.5% consistency, using 1/3 HP or less per ton.



DIRTECS provide thorough, highly effective dirt removal both ahead of the paper machine and for screen tailings.

PRODUCTION HELP *for* SUPERINTENDENTS

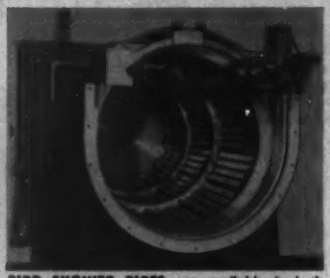
—the men who are contributing so much to the successful operation of equipment for the making of

better pulp and paper and
MORE OF IT PER DAY

For Bulletins, layouts or estimates on any of the items pictured, get in touch with

BIRD MACHINE COMPANY

South Walpole, Mass.



BIRD SHOWER PIPES are available in both Self-Cleaning and Oscillating types. The Oscillating Shower, pictured, increases screening efficiency, uses much less water.

VICKERY FELT CONDITIONERS keep fast running press felts continuously clean and open, eliminating midweek shutdowns for felt washups and speeding drying.

BIRD CONSISTENCY REGULATORS for holding stock consistency to not more than 0.1% heavier or lighter than desired. Dependable, economical, easy to install anywhere.

BIRD SAVE-ALLS return good, expensive fibres to be made into paper instead of going to waste; savings in stock water and time quickly pay for the recovery system.

VICKERY DOCTORS keep papermaking rolls clean and shining — in shape to make more as well as better paper. Engineered for every roll.

Woods Trip Featured at Superintendents Meeting

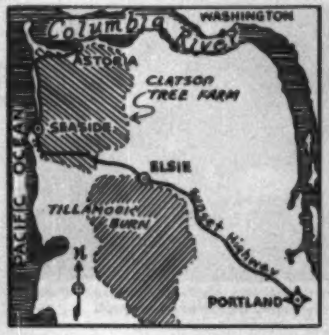
32nd Annual Convention Held at Portland, Oregon

The 32nd annual convention of the American Pulp & Paper Mill Superintendents Assn., one of the most successful in the long history of this organization, began with registration at the Multnomah Hotel, Portland, Ore., on Sunday, June 24, 1951.

The total registration at the meeting, although held down somewhat by the strike of United Airlines pilots, was still approximately 720.

Of course, for those who took the special train from Chicago, Ill., or St. Paul, Minn., the convention actually began on Thursday, June 21. This trip combined two extra days of social activities and pleasant companionship, with a visit to Glacier National Park and a sightseeing bus trip from Bergen-White Salmon, Wash., to Portland over the Columbia River Highway with stops at Bonneville Dam, Multnomah Falls and Vista House on Crown Point.

Charles E. Ackley
Retiring President



Glenn Sutton
New President

The board of directors of the association held their annual meeting on Sunday afternoon, June 24.

The annual dinner of the industrial affiliates was held at 7:00 p.m. Sunday with Alan Hyer of Bagley and Sewall Co. presiding. W. K. Metcalfe, Ross Engineering Co., was elected chairman for the coming year, and Walter Morehouse was elected first vice-chairman.

About 7:45 a.m. on Monday, June 25, fourteen buses carrying more than 500 people, left the Multnomah Hotel for a trip through the Crown Zellerbach logging operations and Clatsop tree farm in the northwest corner of Oregon State.

The route of travel was along Sunset Highway over the Coast Mountain Range and through the northern part of the "Tillamook Burn," the 300,000 acre area which has been swept by three disastrous fires in 1933, 1939 and 1945. It is expected that 14 billion board feet of logs will be salvaged from this area which will exceed the green timber cruise of 1933. To date, 8 billion board feet of dead timber has been logged. In 1947 the people of the State of Oregon passed through their legislature the Forest Rehabilitation Act, which provides $10,000,000 for establishing new forests in the Burn by snag felling, fire protection, planting and seeding. Rehabilitation of the burn has been under way since 1949.

Gus Ostenson
Convention Chairman

Just north of the main Tillamook Burn, between Elsie and Jewell, is an area of 8,000 acres which was purchased by Crown Zellerbach in 1947. The snags in this area are a serious fire hazard and a critical fire menace to the southeast corner of the Clatsop Tree Farm and other adjoining timber ownerships.

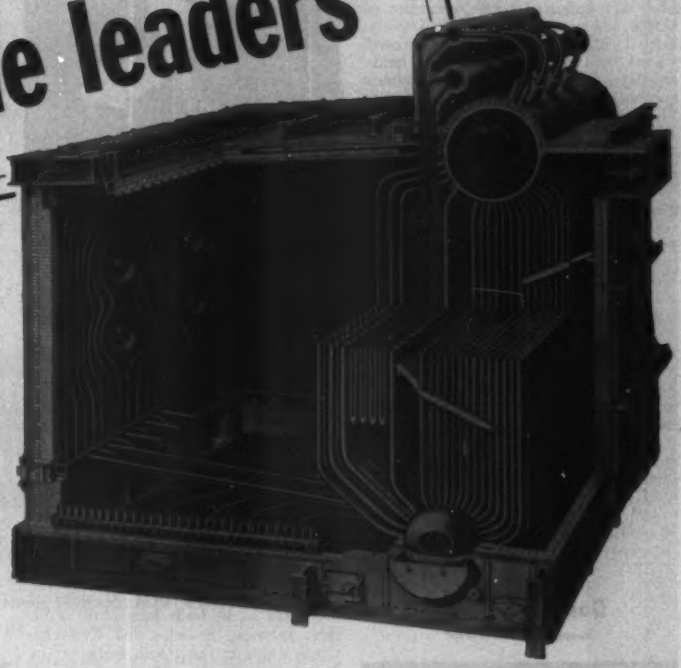
The company has been engaged since 1947 in snag falling to reduce the fire hazard and to salvage whatever logs and pulpwood it can from the snags. To date, about 40,000 snags on 5,200 acres have been felled, forming a continuous firebreak along the Junction Road between Elsie and Jewel.

As the snags are felled, logged, and the fire hazard reduced, reforestation by hand planting and seeding is done to convert this area again to young forests. Douglas-fir, Sitka spruce, and Port Orford cedar from the Forest Industries Nursery (annual production 8 million trees) at Nisqually, Washington, are the species planted.

The Clatsop Tree Farm is a forest of 130,000 acres in the northwest corner of Oregon in Clatsop County, bounded by the Columbia River on the North and the Pacific Ocean on the West.

W. K. Metcalfe
Affiliates Chairman

Choice of the leaders



A partial list of pulp and paper companies that have purchased C-E Vertical-Unit Boilers for one or more mills.

Albemarle Paper Mfg. Co.
Allied Paper Mills
Brompton Pulp & Paper Co., Ltd.
The Brown Company
Canadian International Paper Co., Ltd.
Central Fibre Products Co.
Chemical Paper Mfg. Co.
Chesapeake Corporation
Consolidated Paper Corp., Ltd.
Container Corp. of America
Dryden Paper Co., Ltd.
Eddy Paper Corp.
Fraser Companies, Ltd.
The Gardner Board & Carton Co.
Great Lakes Paper Co., Ltd.
Gulf States Paper Corp.
Hammermill Paper Company
International Paper Co.
Kalamazoo Vegetable Parchment Co.
Kimberly-Clark Corporation
Macon Kraft Corporation
Marathon Paper Mills of Canada, Ltd.
Minnesota & Ontario Paper Co.
Nanaimo Sulphate Pulp Ltd.
National Container Corporation
Nekoosa-Edwards Paper Co.
The Northwest Paper Company
Riegel Carolina Corp.
St. Regis Paper Company
Scott Paper Company
Southern Kraft Division, International Paper Co.
Southern Paperboard Corp.
Southland Paper Mills, Inc.
United Board & Carton Co.
S. D. Warren Company

In all important paper producing areas of the United States and Canada you will find C-E Vertical-Unit Boilers in the plants of leading pulp and paper manufacturers. A partial list of the companies that have purchased VU Units appears at the left. In many cases these companies have placed repeat orders. B-443

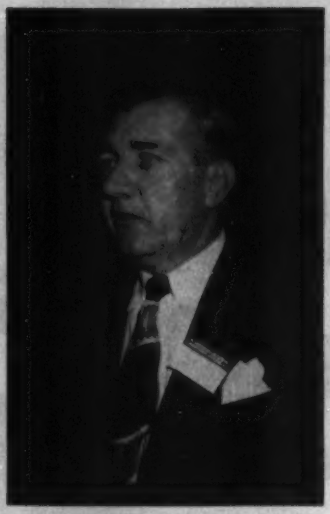
COMBUSTION ENGINEERING—SUPERHEATER, INC.

200 Madison Avenue • New York 16, N. Y.

At its northern edge is Astoria, founded by John Jacob Astor in 1811. Along its western edge is the town of Seaside, which marks the terminus of the Lewis and Clark Expedition of 1804-1805 which Thomas Jefferson organized for the purpose of exploring the Louisiana Purchase, from the Mississippi to the Pacific Coast.

The first purchase of forest land on the Clatsop Tree Farm was in 1893 and subsequently over a period of more than 50 years the Tree Farm has been enlarged to its present size which covers an area of more than 200 square miles. The farm is composed of a well-balanced forest structure of virgin old-growth timber, selectively-logged stands, young second-growth stands, and reforested cut-over lands. Western hemlock is the predominant species although Sitka spruce, Douglas fir, Western red cedar, balsam fir, and red alder also are present in commercial quantities.

Logging has been underway on the Tree Farm more than 100 years beginning with hand logging and bull teams. Now loggers fall trees with power chain saws with draw bars of two to seven feet in length. Tractors, high lead and skyline cable systems yard or pull the logs to the truck load. Loading donkeys with swinging booms, or shovels with air tongs, load the logs on highstaked trucks powered by diesel engines of over 200 h.p. rating. Trucks haul the logs to the booming grounds on rivers or bays where the load is wrapped with steel bands, picked off the truck, lowered in the water and floated as an "asparagus" bundle. Several truckload bundles of pulp logs are made up into rafts and towed up the Columbia to Camas or West Linn mills. If logs are suitable for plywood or lumber they are sorted,



Gordon K. Singletary
First Vice-President

rafted and sold to plywood companies and sawmills.

The next point of interest on the tour was a view, from Sugar Loaf Loop, of the salvage operations of hemlock looper[1] killed timber in the Johnson, Mail, and Vollmer Creek drainage areas.

This is typical of several thousand acres of looper-killed timber (killed in 1944 and 1945) which we have salvaged in the past five years. The hemlock looper killed trees in the stream bottoms, leaving trees on the windswept ridge tops and upper slopes alone. As a result, over 40 miles of road had to be built into Mail, Vollmer, Johnson, Brandes and Klootchie Creek areas in the South Fork of the Necanicum River and the Lewis & Clark River to reach all the dead timber. About 40 million bd. ft. of timber was killed outright. Aerial spraying at a cost of $2.50 per acre checked the spread of the looper and, according to entomologists, saved 200 million bd. ft. from destruction.

Logging Operations on Elk Mountain

Slackline yarding is a system of logging which can be seen from this stop. Clear cutting is the method of logging this windthrown and looper-killed old-growth hemlock stand. Priority of cutting is given over-ripe, old-growth stands which are deteriorating to the point where growth is more than offset by losses from windthrow, insects, and disease. Stands of any age producing net growth are reserved for future cutting in our sustained yield plan.

[1] A worm that defoliates various coniferous species.

The slackline system differs essentially from other skyline systems in that one end of the skyline is wound on a large drum on the yarder and is lowered to hook on the turn of logs and then raised by winding on the skyline drum to lift the logs above obstacles. The other end of the skyline is threaded through a tree shoe and is anchored to a stump beyond the tail tree. This system requires an additional drum on the yarder to handle the skidding line when the conventional mainline is used to operate the slackline.

Advantages of the slackline system are: greater control of the log since it can be instantly elevated or lowered to accommodate ground conditions by tightening or slacking the skyline; the logs can be raised clear of the ground to minimize breakage of brittle species; "roads" can be changed more quickly than with the tight skyline systems since the slackline can be reeled in with the drum and then pulled out to its new location.

Average production from all company operations is 60 truck loads a day hauled by a fleet of 12 trucks. In addition to company production, the Clatsop Tree Farm employs 18 logging contractors for cutting its timber.

Lunch was served to the group at the Necanicum picnic grounds which is maintained by the Clatsop Tree Farm for its enjoyment by the public. A forest fire equipment demonstration was provided here.

Klootchie Creek Road Development

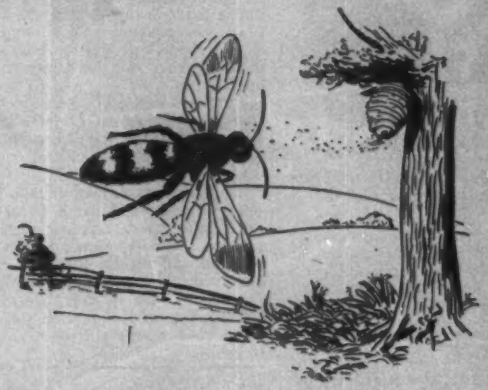
The Klootchie Creek road was built to reach several million feet of looper-killed timber. The first two miles of this road is along the creek bottom running through typical red alder stands about 30 years of age. Sitka

Donald R. Dick
Second Vice-President

Harry E. Hadley
Third Vice-President

Interesting Facts about Paper

Nature's own original paper-maker is the common wasp, which chews up pulp wood and "lubricates" it with saliva for its nest.



interesting facts about CALCOTONE PASTES

The CALCOTONE* PIGMENT PASTES are adapted to beater dyeing and produce shades of good fastness to light and bleeding. Being pigment dispersions, they develop full color rapidly in the beater.

Because of their extremely fine particle size and their compatibility with casein, starch, natural and synthetic latex, CALCOTONE PIGMENT PASTES are suitable for surface coating, wall paper printing, and saturating work.

Ask your Calco Representative for full information about Calco's wide range of colors for paper.

*Trade-mark

Calco®

AMERICAN *Cyanamid* COMPANY
CALCO CHEMICAL DIVISION
DYESTUFF DEPARTMENT
BOUND BROOK, NEW JERSEY

New York · Chicago · Boston · Philadelphia · Charlotte · Providence

M. J. Auchter
Fifth Vice-President

spruce for military aircraft was procured here during World War I.

As the road leaves creek bottom it runs through many typical stands of hemlock timber in which appears an occasional large Sitka spruce from 5 to 7 feet in diameter and 250 feet tall. Major logging problem in this area is to handle both the 6 foot log and the 6 inch log with the same logging equipment.

This road costs about $12,000 per mile and is a typical logging truck road built for heavy log traffic and all-weather trucking. In this wet climate, roads must be ditched, heavily ballasted and surfaced with fine crushed rock. The timber is cut a tree length from the road to "daylight" it, enabling the sun and wind to keep the roadbed dry and maintain a better road surface. Road at main junction becomes part of the Lewis and Clark private truck road.

Old railroad grades have been reconverted as fire truck roads. There are approximately 350 miles of roads of all kinds on the Clatsop Tree Farm, of which 100 miles are fire roads. The great danger from fire makes it imperative to have accessibility into all parts of the forest. Lookouts, telephones, and radio communication are also essential in the fire protection of this forest.

During the trip most of the typical types of west coast logging were seen. A demonstration was provided of one of the most hazardous and yet most interesting jobs, that of topping a tall tree for the high. A 180 ft. tree was "topped" for this demonstration. The falling of a four foot diameter giant was also witnessed by the group.

Other operations or equipment seen included highlead with double drum, air tong loader and truck hauling, tractor and arch skidding, tower yarding, tree topping and bucking. A typical fire weather station was also seen here.

Truck Road on the Lewis & Clark River

The private truck road, tapping more than 30,000 acres of forest land, is being built along the Lewis & Clark River. Present construction involves reconversion of the old Lewis & Clark railroad grade into a high class truck road 12 miles in length, with future extensions. Permanent installations such as the 153 foot steel truss bridge across the South Fork of the Lewis & Clarke River, and the underpass at Heckard's Crossing, are being put in.

Unloading, Booming and Rafting at Lewis & Clark Boom

This point is the terminus of both Crown Zellerbach's private truck road on the Lewis & Clark River as well as public roads in this district. Lewis and Clark Dump handles all purchase logs in the vicinity as well as timber production from our Necanicum River operations.

Purchase logs and company production are weighed on Morse-Fairbanks scales. Dump has handled as many as 130 loads in one day; average number of loads 110 a day.

The entire truck load of pulp logs is strapped with steel bands before lowering into water. Loading as an "asparagus" bundle eliminates "sinker" problem and results in lower rafting and towing costs. High value spruce, Douglas fir, and cedar logs are dumped loose in the river, flatrafted and scaled in the conventional way for destination to sawmills.

Panoramic View of Tree Farm

Many of the group took advantage of the opportunity to view the Clatsop Tree Farm from the top of the Astor Column.

About 75 percent of the Clatsop Tree Farm can be seen directly from this point. The Lewis & Clark, Youngs, Klaskanine, Walluski, and John Day Rivers are important waterways for the development of Crown Zellerbach timberlands. Actually, the longest truck haul, 36 miles, is at the scene of the present logging operations on the Necanicum River. The bulk of the timber on the Clatsop Tree Farm is within an average truck haul distance of 12 miles to water. The location on the Columbia River gives timber on the Clatsop Tree Farm a strategic transportation advantage over most of the region's timber supply.

Forest Plantations

The final items on the program consisted of the showing of various tree plantations. Since 1926, 11,942 acres of logged land within the Clatsop Tree Farm have either been hand-planted, hand-seeded, or aerial seeded, as follows:

	Planting Acres	Hand Seeding Acres	Aerial Seeding Acres	Rodent Control Acres	Total Acres
1926-27	399				399
1926-29	1,917				1,917
1927-33	2,373				2,373
1945	212				212
1946	441				441
1047	303	140	700		1,143
1948	311	247	1,640		2,198
1949	171		525		696
1950	270		476	420	1,166
1951	1,317		500		1,817
Totals to Date	7,714	387	3,841	420	12,362

Longview Fibre Co. Mill Visit

Left to right—Ed Pugel, Guide; Jesse W. Trask, Shawano Paper Mills; D. H. Putnam, General Electric Co.; Mrs. D. H. Putnam; Sam Hallberg, Camp Corp.; William Hall, Victoria Paper Mills.

Here are seen various operations in the Lindsay plant. All of them are performed with care, care and more care in order to perfect quality wire cloth which will aid paper makers in producing better paper. Lindsay Fourdrinier wires are really "babied" at every stage of their manufacture.

THE LINDSAY WIRE WEAVING COMPANY
14001-14299 ASPINWALL AVE. • CLEVELAND 10, OHIO

Lindsay **WIRES**

Above—International Brotherhood of Migratory Peddlers Breakfast Entertainment; Left to Right, John Fulton, Supt.; Ray Smythe, Chairman of Board, Dave Fulton, Burke Morden, Harris Foon and H. A. Dos Marais. At Right—Mr. and Mrs. William Clark of Longview, Wash., enjoy a moment of relaxation. Mr. Clark is Paper Mill Supt. of Longview Fibre Co.

Hand planting of seedlings or sowing of seed is only used to supplement natural stocking in places where cut-over land does not stock promptly after logging due to fires, poor seed years, blowdown of seed sources, or heavy brush and weed competition.

Hand planting of seedlings costs today about $16 per acre. Aerial seeding costs $4 to $5 per acre.

The individual trees of one 14 year old plantation were pruned to show their size.

These stands are growing in height at the rate of about 3 feet per year and 1 inch in diameter every three years. In 20 years the trees in these dense stands will have pruned their limbs naturally and will contain pulpwood suitable for cutting.

The groups that embarked on the return trip to Portland were tired but were happy with the knowledge that they had not only spent a very pleasant day but had also been privileged to obtain a brief education in practical forestry.

The cocktail party scheduled for 6:00 P.M. at the Multnomah was delayed for almost an hour to allow the last of the groups returning from the wood trip sufficient time to shower and change. The cocktail party was followed by a chuck-wagon buffet supper and dance.

Charles Ackley, President of the Association delivered an address of welcome to the members and guests.

On Tuesday, June 26th, the convention was divided into about five different groups. There were three mill trips as follows: (1) Longview, Wash. where both the Longview Fibre Co. and Weyerhaeuser mills were visited; (2) Camas, Wash. where the Crown-Zellerbach mill was seen and (3) the Oregon City and West Linn trip where Publishers Paper Co. and the West Linn Crown Zellerbach mills were visited. The Oregon City visit also included a ceremony dedicating the Oregon City mill as the first paper mill in the Pacific Northwest. In addition to the mill trips there was the men's golf tournament, ladies golf tournament in the morning and a card party in the afternoon.

Wednesday, June 27th, got off to a good start with breakfast for everyone in the grand ballroom at 8:00 A.M., followed immediately by an entertainment program provided by the International Brotherhood of Migratory Peddlers. This was an amusing skit depicting some of the troubles of papermakers with Charlie Ackley cast in the role of papermaking expert. An excellent "stage-prop" paper machine lent a touch of realism to the show. This machine fell completely apart when Charlie Ackley tried to run it.

At 9:00 A.M. there was a business meeting of the Pacific Coast Section of the superintendents association which was followed by the annual business meeting of the National Association with Charles Ackley presiding.

The Invocation was by Rev. Orval M. Whitman, Pastor of First Metho-

Watching Logs Being Fed into Whole Log Chipper at Weyerhaeuser's Longview Mill

Board Experts Watching the Operation of the Cylinder Machine at Longview Fibre Co.

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No more mail! Not a single scrap of paper to write, type, or print on! Imagine what that would mean to America . . . how it would affect every citizen . . . every profession and industry. Most serious of all would be the threat to the nation's strength and security . . . when vital correspondence, documents, orders, and information vanished from the scene! *Unthinkable?* Don't take paper for granted. Anything so basic should be thought about . . . and safeguarded. The free flow of communication through our postal arteries depends on paper. *America* depends on paper! Use it wisely . . . protect its production . . . keep America strong.

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WOOLEN MILLS
APPLETON, WIS.

Group at Stagecoach Inn. L-R, H. H. Stilwell, R. F. Engelhardt, Larry H. Woodside, Harry Hadley and Lloyd J. Whims.

Board Session Audience. Front Row L-R, Walter Wolfe, John Stinson and Harry Hadley.

Glen Renegar, at left, was chairman and Charles Walton presented a paper at Board Session

dist Church, Oregon City, Ore. and was followed by reading of the Necrology by Harry Weston. A special eulogy of Robert Heuer was delivered by W. A. Salmonson.

The Presidents message was then delivered by Charles Ackley and was followed immediately by the secretary-treasurer's report and the committee reports.

The following slate of officers was presented by the nominating committee and duly elected for the coming year; president, Glen Sutton, Sutherland Paper Co., Kalamazoo, Mich.; 1st vice-pres., Gordon K. Singletary, Brunswick Pulp and Paper Co., Brunswick, Ga.; 2nd vice-pres., Donald R. Dick, Howard Smith Paper Mills, Ltd., Cornwall, Ontario, Canada; 3rd vice-pres., Harry E. Hadley, Gardner Board & Carton Co., Middletown, Ohio; 4th vice-pres., Howard H. Street, National Vulcanized Fibre Co., Yorklyn, Delaware; 5th vice-pres., Martin J. Auchter, Hoberg Paper Co., Green Bay, Wis.

Two new members were added to the board of trustees, Howard Harrison and Roy Kelley. The board now consists of the following: Fred C. Boyce, Milwaukee, Wis.; William H. Brydges, Lynchburg, Va.; Raymond L. Barton, Plainwell, Mich.; Howard Harrison, Middletown, Ohio and Roy H. Kelly, Rothschild, Wis.

H. R. Russell
Convention Advisory Committee

The business meeting was followed by a general conference with Charles Ackley presiding. The following papers were presented: "The Pulpwood Situation in the Pacific Northwest" by Stuart Moir, Forest Counsel, Western Forestry and Conservation Association, Portland, Ore.; "The Wood Pulp Emergency" by Lawson P. Turcotte, Pres., Puget Sound Pulp & Timber Co., Bellingham, Wash.; "Pulp and Paper Industry of the U. S. in Today's Economy" by Dr. Louis Stevenson, American Paper and Pulp Association, New York, N. Y. (Delivered by Harry Weston)

L. R. Hartman
Chairman Pacific Coast Div.

The Wednesday Luncheon was presided over by Alan Hyer, chairman of the industrial affiliates. Gus Ostenson, Convention Chairman introduced the guest speaker, Dr. Lauren Donaldson, Director of Applied Fisheries Laboratory, University of Washington, Seattle, Wash. Dr. Donaldson gave a very interesting talk on the studies which have been made on the effect of atomic explosion on fish and animal life at Bikini and Eniwetok.

Phil Goldsmith at left, and Walter Wolfe Presented Papers at Board Session

R. W. Riley, at left, and A. G. Natwick at Thursday Luncheon

Seen at the Convention

Left—S. A. Salmonson, representative of Chemical Linings and Draper Bros. Right—T. H. Grant, Sulphite Supt., Publishers Paper Co.

Left—W. E. Greene, W. E. Greene Co. Right—C. T. Dunn, Fibreboard Products Co., Antioch, Calif.

Following the luncheon, there were three afternoon sessions as follows: Papermaking Round Table (Assembly Room) — Gus Ostenson, Convention Chairman, presiding. "How We Keep Our Machines in Tip-Top Shape" by R. P. Wollenberg, Chief of Engineering Division, Longview Fibre Co., Longview, Wash.; "Problems Relative to a High-Speed Kraft Machine" by John A. McDermott, Paper Mill Superintendent, St. Regis Paper Co., Tacoma, Wash. (Presented by John Victor of the same company); "Problems Relative to High-Speed News Machines" by A. E. Hansen, Assistant Paper Mill Superintendant, Powell River Co., Ltd., Powell River, B. C., Canada.

R. P. Wollenberg
Chairman, Woods and Wood Preparation Meeting.

A. C. McCorry
presented paper at Kraft Round Table.

Sulphite Round Table (Colonial Room) — Jesse R. Lewis, Resident Manager, Coos Bay Pulp Corp., Anacortes, Wash., Presiding. "Amonia Base Sulphite Production" by R. Douglas Waddell, Technical Supervisor, Crown Zellerbach Corp., Lebanon Div., Lebanon, Ore.; "Ethyl Alcohol—Is It a Solution to the Sulphite Waste Liquor Problem?" by Erik Ekholm, vice-pres., Puget Sound Pulp & Timber Co., Bellingham, Wash.; "Sulphite Pulps for a Specialty Mill" by J. V. Savage, Sulphite Mill Superintendent, Crown Zellerbach Corp., Camas, Wash.; "Metal Allocation" by Lee E. Hill, Jr., Plant Engineer, Weyerhaeuser Timber Co., Pulp Div., Everett, Wash.

John Victor
presented paper at Paper Making Round Table.

W. Welblen, at left, presented a paper and Arthur V. Cole presided at Finishing Meeting

W. Farley, left, presented paper at Woods and Wood Preparation Meeting. George A. Holt presented paper at Finishing Meeting.

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Stuart Moir
Presented Paper at Wednesday General Conference

Kraft Round Table (Marine Room) —Gerald F. Alcorn, Construction Engineer, Weyerhaeuser Timber Co., Pulp Div., Longview, Wash., presiding. "Maintenance Problems of the Recovery Furnace Room" by Russell Graff, Assistant Pulp Mill Superintendent, Longview Fibre Co., Longview, Wash.; "Caustic Room Operation" by A. C. McCorry, General Superintendent, St. Regis Paper Co., Tacoma, Wash.; "Lime Recovery Equipment" by W. H. Tock, Engineer, Basic Industries Dept., Allis-Chalmers Mfg. Co., Milwaukee, Wis.; "Hot Stock Refining in a Kraft Mill" by Gordon Petrie, Sales Engr., Shartle Bros. Machine Co., Portland, Ore.; "Stabilization Douglas Fir Kraft Black Liquor" by G. Gerritt de Haas, Research Div., Weyerhaeuser Timber Co., Tacoma, Wash.

On Thursday morning there were three concurrent meetings, all beginning at 9:30 A.M. as follows: Board (Marine Room)—Glen T. Renegar, Plant Superintendent, Container Corp. of America, Philadelphia Div., Philadelphia, Pa., presiding. "Insulation Board Manufacturing" by Charles L. Walton, Manager, Simpson Logging Co., Woodfiber Div., Shelton, Wash.; "What we have done to Remain Competitive" by Walter F. Wolfe, Superintendent, Mac Sim Bar Paper Co., Div. of United Biscuit Co. of America, Otsego, Mich.; "Design of Cylinder Machine Vats" by Philip H. Goldsmith, Sales and Development Engineer, The Pusey and Jones Corp., Wilmington Delaware; "Stock Preparation in Board Mill" by Lee Eberhardt, The Bauer Bros. Co., Springfield, Ohio.

Woods and Wood Preparation (Colonial Room)—R. P. Wollenberg, Chief of Engineering Div., Longview Fibre Co., Longview, Wash., presiding. "Newer Trends in Pulpwood Handling" by Raymond L. Howerton, Manager of Sales Promotion, Hyster Co., Seattle, Wash.; "Recent Advances in Barker Design" by Meder Johnson, Manager, James Brinkley Co., Seattle, Wash.; "Wood Handling and Chip Servicing" by William Farley, Technical Assistant to Wood Mill Superintendent, Crown Zellerbach Corp., Camas, Wash.; "Screening Book Groundwood from Western Softwoods" by Arthur Palmer, Groundwood Mill Superintendent, Crown Zellerbach Corp., West Linn, Ore.

Finishing (Junior Ballroom) — Arthur W. Cole, Superintendent, Rex Paper Co., Kalamazoo, Mich., presiding. "Practical Operation of Rotary and Sheet Cutters" by George A. Holt, General Superintendent, Rayonier, Inc., Hoquiam, Wash.; "How We Operate Our Supercalenders" by Robert W. Riley, Superintendent of Coated Paper, Crown Zellerbach Corp., West Linn, Ore.; "Expediting the Packaging and Shipping of Paper" by J. W. Weiblen, Superintendent of Finishing,

Left Mrs. Sven Fahlgren and right Mrs. V. P. Owens enjoyed the Ladies' Program

Sulphite Round Table
Left to Right—Jesse R. Lewis, L. E. Hill, Jr., J. V. Savage and R. D. Waddell

Woods and Wood Preparation Session
Left to Right—R. L. Howerton, Arthur Palmer, Meder Johnson and R. P. Wollenberg

N. Y. State College of Forestry Pulp & Paper Alumni Breakfast. L-R, L. M. Sutherland, Sutherland Refiner Corp.; C. A. Chapman, Hercules Powder Co.; L. Woodside, Albany Felt Co.; H. Axel Norseen, Valley Iron Works; Russell T. Lewis, Ohio Boxboard Co.; Walter B. Morehouse, Napco Chemical Co.; Harry Weston, Secretary A.P.P.M.S.A.; Vernon Woodside, Mathieson Chemical Corp.; Ken Matchut, Maxwell Paper Co., Elmer K. Stilbert, Dow Chemical Co.; Bill Converse, Sprout-Waldron Co.

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P. O. Box 270 Sandersville, Ga.

Robert Boaz
At Thursday General Conference

Matthew T. Hill
Associate Justice, Supreme Court of Washington State

Raymond P. Hill
At Thursday General Conference

Columbia River Paper Mills, Vancouver, Wash.

Charles Ackley, association president, presided at the Thursday Luncheon. The principal speaker, the Honorable Matthew T. Hill, Associate Justice of the Supreme Court of the State of Washington was introduced by Al Wilson, editor of Pulp & Paper Magazine. Mr. Hill gave a very enjoyable and educational talk on "Americanism."

There was a single session on Thursday afternoon beginning at 2:30 p.m. as follows: General Conference (Assembly Room)—L. R. Hartman, chairman, Pacific Coast Div., presiding. "Is the Superintendent a Salesman?" by William Beckett, Executive Vice President, The Beckett Paper Co., Hamilton, Ohio, presented by B. E. Natwick; "The How and Why of Protective Coatings" by Raymond P. Hill, President, Chemical Proof Construction, Inc., Seattle, Wash.; "Stainless High Alloy Steels—Current Developments Affecting the Pulp and Paper Industry" by James T. Gow, Chief Metallurgist, Electric Steel Foundry Co., Portland, Ore.; "Supervisory Development—Don't Tell 'em 'til you Ask 'em" by Robert Boaz, Director, Personnel Development Service, Seattle, Wash.

The final events of the convention were the "Get-Together" party at 6:00 P.M. Thursday in the Assembly Room, followed by the annual banquet which began about 8:00 P.M. in the grand ballroom with Charles Ackley as toastmaster. After the presentation of door prizes and past presidents award the chair was taken over by Glenn Sutton the new asociation president. An excellent floor show was then presented and was followed by dancing until the small hours.

The ladies program was arranged by the following committee: Mrs. W. W. Clarke; Mrs. E. G. Drew; Mrs. P. J. Onkels; Mrs. E. Wennberg; Mr. Robert Baer; Mr. J. B. Sutherland.

The ladies program was the same as the men's on Monday. On Tuesday they played golf and had lunch at the Alderwood Country Club. Tuesday afternoon was devoted to Canasta and bridge in the Emerald Room of the Multnomah. At 4:00 P.M. the wives of National Officers were honored at tea in the Marine Room.

At 10:00 A.M. Wednesday buses left the Multnomah for Timberline Lodge located at timber line on Mt. Hood. After luncheon at the lodge the ladies rode the ski-tow or enjoyed the views from various points in the vicinity. Buses returned to Portland in time for dinner.

On Thursday morning at 9:30 A.M. buses left the Multnomah for a sightseeing tour of Portland. At 12:30 P.M Mrs. Gus Ostenson presided at luncheon in the "Rose Bowl" of the Multnomah Hotel. Wives of the Officers of the Pacific Coast Div. of Superintendents were honored at this affair.

The ladies joined the men for the annual "Get-Together" party and banquet on Thursday evening.

Fire Protection Field Meeting

Some 70 miles north of Mont Laurier, Que., at the Pine Lake Depot of the James Maclaren Co. Ltd. on the Lievre River, 70 foresters, woods operating personnel, and officials of the federal and provincial government forest services, the RCAF, Meteorological Division of the Dept. of Transport, forest protective associations, the pulp and paper industry and some of its suppliers from eastern Canada and the United States met for the two-day field meeting of the Woodslands Section, CPPA, on forest fire protection. The meeting was arranged by the Section's forest fire protection committee of which G. A. Kingston, manager, Lower Ottawa Forest Protective Assn., Maniwaki, Que., is chairman.

Following dinner in the cook-house, Mr. Kingston, who acted as chairman of the meeting, welcomed the delegates. D. W. Jamer, woods manager, The James Maclaren Co. Ltd., Buckingham, Que., welcomed the delegates on behalf of his company.

Mr. Kingston briefly outlined the organization of the six forest protective associations in Quebec. When the Quebec provincial government grants timber limits, it requires the limit holder to pay for fire protection of the limits. However, unlike other provinces, Quebec gives the permitee a choice. A company can either request the provincial government to arrange for the protective services and pay for them, or it can form an association with neighboring limit holders which will do the work, subject to supervision of the provincial authorities. As a result, six forest protective associations are operating and covering over half the limits in the province.

The following morning, delegates were given a demonstration of the helicopter and several were given short rides. Pumps and fire hoses were displayed. And various types of radio communication equipment were in operation.

Following the equipment demonstrations, the delegates gathered for the morning session. Mr. Kingston introduced Mr. Hanchet who gave a paper on the use of helicopters in fire detection and suppression. He said that the aircraft could be used to ferry firefighting crew and equipment from an advance base to the fire. It could carry in necessary supplies, perform reconnaissance work, and provide an aerial observation point for direction of the fire fighting forces. It can also be used to withdraw men and supplies from the path of a fire. The helicopter, Mr. Hanchet said, is a supplementary means of transportation designed to complement fixed wing air transport services.

After lunch, there was a fire crew contest between three teams from the upper and lower Lievre and Maniwaki districts. A smoke bomb was released some 300 yards from the camp. From the helicopter the "fire" was reported by radio to the camp. The three teams

(Continued on page 78)

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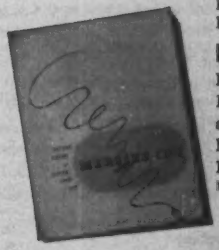

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The Place of the Paper Industry in the United States Economy*

Dr. Louis T. Stevenson
Economist, American Paper and Pulp Assn.

It is but repeating a many times twice-told tale to say that the paper and board industry ranks as the sixth largest industry in the United States, when ranked by value of product. Ahead of it, according to the U. S. Bureau of the Census, come Motor Vehicles, Meat Packing, Steel Works, Petroleum Refining and Cotton Broad Woven Fabrics. This ranking was established by the Bureau of the Census in a tabulation which eliminated duplications such as would arise by including with paper and board the pulp industry and the converted paper products industries. Yes, the paper and board industry is officially and accurately ranked sixth, and yet few people outside of the industry realize its size, complexity and importance to the United States Economy because few people stop to think about paper at all. Paper is so much a part of the everyday life of an American that he simply takes it for granted. It is there in abundance when needed, and its cost is so small that it is but an incidental expense for most individuals and for most businesses.

Just where does the paper industry, and in that term I shall include all paper and board, fit into the American economic picture? The answer is—everywhere!! There is not a farm, factory, business, railroad or other transportation system that can operate without using paper. Its use is essential to the operation of our governments, local, state and national; to our banking system; to our systems of communication; to our systems of distribution; and above all, to our Armed Services which, during the last war, listed over 700,000 uses for paper. The use of paper had become so essential to the operation of our economy that in 1944, Donald Nelson, head of the War Production Board, stated that the paper and pulp industry was one of the most essential of all our industries.

The Functions of Paper in the U. S. Economy

The first use of paper by man was as a medium on which to transmit and record ideas or facts. Paper has thus been used by all peoples since its original development by the Chinese about the first century A.D. In the storied libraries of our country and other countries are kept the vast treasures of knowledge on which our entire civilization and educational system are built. All kinds of research depend upon facts recorded on paper, as do all the sciences: chemistry, physics, etc., etc. It is not too much to say that our Western Civilization was born on paper records and is disseminated through the use of the printed word.

In the United States the vast printing and publishing industry carries out the major part of this function. Local governments also keep the legal records of property transfers on paper, all kinds of other governmental agencies keep records of laws, official orders, transactions, and in most instances these are published. It is estimated that over 10,000,000 tons of paper were required in the United States during 1950 to record and transmit ideas. This estimate, of course, includes the newsprint imported and used in this country.

In this brief presentation it is impossible to list comprehensively all the uses of paper to satisfy this function. One can hope to mention but a few which may stir the imagination to review the subject and bring to mind many other instances in individual experience.

The Packaging and Protective Function

One of the fastest growing fields for the use of paper and board is that of packaging. The modern package must perform satisfactorily under severe conditions of handling, climate and storage. Paperboard has grown tremendously in volume in recent years because the product has been adapted to meet more and more exacting requirements. The advent of the paper shipping sack, both single and multi-wall, has greatly expanded the use of kraft paper in that field.

Special research into the application of sulphite wrappings, glassine, greaseproof and vegetable parchment, has widened the use of these papers.

Over 13,500,000 tons of paper and board were used during 1950 in packaging United States products.

The Sanitary Function

It has been proved conclusively that when paper or board comes off the paper machine it is a perfect sanitary product so far as cleanliness is concerned — there are *no* coliform bacteria present. Paper is, because of its low cost and disposability, "a natural" for many sanitary purposes. Paper napkins, facial tissues, milk bottles and bottle caps, ice cream containers, frozen food containers and wrappers are but examples of the many applications of paper as a sanitary product. It is not easy to estimate the total tonnage of these papers, but approximately 1,500,000 tons were consumed in 1950. This is one of the most rapidly growing branches of the paper industry.

Some Economic Aspects of Papermaking

Papermaking is a mass production industry, generally located in small communities, and using large volumes of process water. Its power requirements are great because the machinery is heavy and the grinding action demands power.

The net result of these characteristics is the economic stimulation of many small communities by the steady stream of pay roll and investment money brought to these small towns and cities by the pulp and paper mills located in them.

Wood pulp mills are dependent for their raw materials upon forest resources. The mills also require huge long term capital investments. As a consequence of these two factors the careful plant management must assure itself of adequate forest resources and consequently the pulp industry is and has been in the forefront of commercial forestry developments to assure permanent wood supplies. A pulp mill without reasonably priced wood "dies on the stem," as it were. The joint use of a forest for the production of saw logs, other wood products and wood pulp is an almost ideally economical set up when the forest is handled so as to assure a continuous flow of wood. Waste is reduced and a greater overall utilization of the wood results.

Some Facts and Figures

The primary paper industry in the United States will be able to produce over six billion dollars worth of goods this year. Employment in the industry is running currently at 209,000 workers, exclusive of woods workers and salaried individuals. The present annual payroll will approximate $765,000,000. All told, it is estimated that including woods workers, about 500,000 workers of all kinds are employed in our primary pulp and papermaking industry.

* Presented at the 32 Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Multnomah Hotel, Portland, Ore., June 24-28, 1951.

Wrapping paper is no longer just an overhead expense! Business-wise retailers are discovering that when they use colored wrapping paper, it becomes a *salesman*... an animated advertisement in the streets, on buses... even in the home.

But many retailers haven't discovered the extra advertising value their wrappings can give them. They're still using nondescript paper. They are a ready market for colored wrapping paper, cartons and bags. Tell them about this advertising *plus*—and *you* can wrap up a big plus in profits.

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BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

Directly dependent upon the product of the paper industry are the printing and publishing industry, and the manufacturers of converted paper products. Between these two industry groups and the pulp and paper industry, over a million people are employed, drawing about $3,400 million annual pay. Thus, over one million people are directly engaged in the manufacture, printing, and otherwise processing paper. In addition to this, an almost immeasurable army is engaged in the distribution and use of paper.

For example, a manager of a large department store last fall asked me, when he had difficulty in getting an adequate supply of wrapping paper, "What would you do, Dr. Stevenson, if you couldn't get the material without which you could not operate?"

We may think of stores as relatively small users of paper. They think that paper is an absolutely necessary material without which they can not operate. They can close out a line of merchandise and still do business, but they can not operate without paper!

But if we are going to include all direct and indirect users of paper in our statement, we cannot avoid mentioning all the 153 million individuals in the United States who come within that category!!! And the entire gross national product of over 313 billion dollars is affected. Certainly, without paper it would be sadly deflated.

The Paper Industry as an Investment

During the past ten years the paper industry has come to be considered by the investing public as an industry in which satisfactory investments can be made. Like all other industries, the paper industry offers investment opportunities that may vary by company, but taking the industry as a whole, its record will bear analysis for years back as well as during the post war periods.

The paper industry earnings record, taken as an industry, will stand up with "all industry" earnings in depression as in prosperity, for in fact, the paper industry has operated more steadily in depression periods than most industries. In the low year of the great depression (1932), the paper industry was operating at 58% of capacity, while steel was almost flat on its back below 20% and banks dependent upon the automobile industry were in distress.

The paper industry is, of course, a service industry, and it therefore is dependent upon general business activity for its own activity. But it must be remembered that whatever business is done demands the use of paper as a necessity *Business can not be done without paper!*

Summary

The paper industry, sixth largest industry in the country, is dependent primarily upon adequate supplies of wood and water. Its products permeate the whole economy which is, as presently constituted, dependent upon a constant flow of products from the paper industry. This supply of paper is essential to the production of our over 313 billion dollar Gross National Product.

Paper production is located largely in small towns and cities in 37 of the 48 States. Consequently the pay rolls and investment money of these mills are widely distributed and stimulate the business activity of these communities.

The paper industry's earnings over a considerable period compare favorably with "all industry" earnings. The paper industry's investment status has risen as this fact has been realized.

The Pulp Situation*

Lawson P. Turcotte

President of Puget Sound Pulp & Timber Co.

In talking to you on the subject of "The Pulp Situation" one has of necessity to steer clear of any situation which may be presently acute, and has to base his thinking on a longer range trend. While pulp may be scarce at the moment, the supply and demand situation is not too far out of line, so my remarks will cover what I believe is more important to everyone, and that is possible fibre supply for the longer range based upon past experiences and future trends in fibre uses.

Many of you will, no doubt, remember when Pacific Coast Hemlock pulp appeared on the market in commercial quantities, starting back in 1927. I know I remember it very well as the company I am connected with was one of the first in this field, and I very well remember the struggle to get it established. This is natural, but it is also to the credit of the paper industry in this country that in spite of the availability of other established grades of foreign pulps, many mills in the United States had enough vision to support this new industry on the Pacific Coast by using its product, produced from a different specie of raw material, in some instances packaged in an entirely different manner, and eventually were so converted to the product that many new, fine pulp mills have been constructed in this area.

Now this could not have happened if the paper mill superintendents had not co-operated with the patience required when trying out, not a new product, but a different product. This co-operation, to my mind, has greatly assisted, not only in the growth of the industry in the Pacific Northwest, but in the growing stability of the pulp industry.

If we turn our eyes to the Southern States, we find a repetition of the experiences of the Pacific Northwest, not so much in the pulp production end for market, but as an integrated industry. All of us remember the many years of study put in by a few men of vision which brought about this great new industry in the South. Again, the superintendents had to give wholehearted co-operation to these developments, otherwise it could not have happened so swiftly and so efficiently.

In connection with the development of the West Coast and Southern pulp industries, I am taking the liberty of making a couple of short quotations by West Coast pulp producers, one from an address to Pulp & Paper Mill Superintendents 20 years ago, back in 1931, just at the start of the West Coast pulp development. Remember, this is 20 years ago.

"Today the West Coast sulphite manufacturers do not present their pulps to the Eastern markets with apologies, for they feel that their products are the equal of the other pulps being offered, both Eastern and foreign."

* Presented at the 32nd Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Multnomah Hotel, Portland, Ore., June 24-28, 1951.

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Fast's Couplings assure long, trouble-free life. Records prove that Fast's installed in 1920 and 1922 are *still in use*... on sectional paper mill drives, on Jordan machines and on auxiliary machinery. And that's a record never equalled by any other flexible coupling!

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Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

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City.....Zone.....State.....

Pacific Coast pulp is no longer any Cinderella. Its merits have been discovered by many among you.

Another public statement made just 20 years ago this month, in June 1931, reading as follows, was highly prophetic:

"The Far Western States and the South have in the last five years proven conclusively that they have, by American ingenuity and discovery of enormous stands of pulpwood, made it possible to assure ourselves for all time to come of pulp and paper products from our own timber lands. The thought that has been expressed by many that certain species of timber existing in foreign countries are superior for paper making is rapidly being dispelled, and the far western states, the South and our other states can produce every pound of paper and pulp products required in this country of a quality equal to anything produced in any of the foreign countries."

I think it is well to remind ourselves of the contribution made to the pulp supply in the United States by these two areas, which in 1949 provided 70% of the pulp produced in the entire United States, as contrasted with 30% in 1930, and in the meantime the nation's production had risen from 4,750,000 tons to over 12 million tons, so the relative percentages have a much greater meaning than the figures show. Without these two great developments the United States would have been in a bad way, indeed, for paper and other cellulose products.

If the past has taught us only one thing, and that is that woodpulp can be manufactured from many new species of wood, it has been well worth the effort and denotes what the future holds as to development of additional fibre.

In trying to look into the future, of necessity, we must use some basis of past experiences. For instance, domestic consumption of pulp has increased, roughly, 8 million tons in the past 25 years, or at the average rate of 320,000 tons annually. Paper consumption has increased in 25 years by 15 million tons, or 600,000 tons annually. Pulpwood consumption has increased in 25 years by 14 million cords, or at an average yearly rate of 560,000 cords.

Increase in population alone in the next 25 years, based on present per capita consumption, will require an increase of 7 million tons of paper production. With new uses being developed for fibres, it is safe to assume that another 7 million tons of fibre products will be required, or a total of 14 million tons in addition to the present consumption of 25 million, or a total of some 39 million tons by 1975.

39 million tons of paper, paperboard, and other cellulose products, based on present relations as to domestic production and imports, would require a domestic production of 20 million tons of pulp as against the present 13 million, and a pulpwood consumption of 33 million cords as against the present 21 million cords.

This last figure of 33 million cords consumption of pulpwood, or it could be higher by 1975, is the meat of the cocoanut. Production of the pulp and all other finished products can very well be taken care of, but we want to be sure that we have the pulpwood not only for the next 25 years, but forever, and we cannot overlook the fact that this wood, or its equivalent in pulp, must originate from the North American Continent, as we no longer can count on supplies from other parts of the world. As a matter of fact, my opinion is that we are going to have to supply other world markets with our fibre materials, whether it be in raw material form or in finished products.

If we now refer to the volume of timber on commercial forest lands of the United States and take the figures based on a re-appraisal by the United States Forest Service in 1945, we find the following interesting facts, and this should be of interest to anyone connected with an industry using wood fibres.

Quoting from "The Nation's Wood Supply" comes the following important statement:

"The forests are not so meager as to cause public alarm, nor are they so abundant as to justify complacency."

And to my mind the words "nor are they so abundant as to justify complacency" are the most important ones to keep before us.

If we take a look at saw timber (which covers all timber 5 inches or over in diameter breast high), there is every sign that saw timber requirements will more and more encroach on what has heretofore been considered pulp timber. This has already taken place in many areas in the United States to a marked degree, and this has naturally guided the pulpwood user to the use of smaller species of wood and waste fibres of all kinds. According to the 1945 re-appraisal by the United States Forest Service, there were 1,601 billion board feet of standing saw timber in the United States. In 1944 the removal for that year was 54 billion feet which included consumption, fire, insect and disease losses. In that year it was estimated that removal was 1.53 times new growth. If this rate of removal and new growth remained constant, annual depletion would be 18½ billion feet annually, and in 87 years from 1945 the nation's inventory of 1,601 billion board feet of standing saw timber would be removed.

However, if the trend of new growth as against the removal shows the strides that it has made in the past 20 years, this life of saw timber can be extended many, many years.

Taking the picture of all timber on commercial lands of the United States, the picture is much brighter, and shows that removal of timber in 1944, according to Federal appraisal, was 13,661,000,000 cubic feet, while new growth was 13,370,000,000 cubic feet which, as you can see, is pretty close to balance.

But here again we must take into consideration the increasing demands for fibre products through continuous population increase, new uses for fibre products, and the probable demand on North America, by other countries for our products manufactured from wood fibres.

In 25 years the combination of these demands could very well call for an increase of 65% in wood fibre requirements, and the important question to which we must provide the answer is:

Can the ownerships of timber, comprising Federal and State governments and private holders of timber, continue to provide new growth of forest to nearly equal the drain so as to minimize the depletion of our present forest inventory?

The answer should be "Yes" if the ownerships in question continue and improve upon the present practices in effect which have shown remarkable results, but to assure the continued equalization of growth and increased usage of timber, I think further constructive steps are possible, and are as follows:

1. Constant research by public and private bodies to provide for use of new and untried species of wood in the manufacture of finished fibres. It is remarkable what has been done in the past 25 years along this line, but we must be prepared to equalize or better this record in the future, if we are to hold our own, and this is where operators of fibre-using plants can make the most effective contribution to future fibre supply.

2. The return to private ownership of State and Federal logged-off lands, where these holdings are intermingled or contiguous to substantial private ownerships, provided the private ownerships in question are being reforested in a proper manner. This will make for more efficient management of these lands so situated.

3. Continued and increased efforts by both government and private ownerships to combat the ravages of fire, insect, and disease in timber holdings. A lot can be accomplished by development of access roads into government ownerships. There are many bug-infested areas today which, by the time access roads are completed, it will be too late to save the timber for use. This is a terrific drain on our forests, and appropriations for access roads into Federal and State timber ownerships should be near the top of the list in budget appropriations. We must reduce the annual drain on our timber caused by fire, insects and disease.

4. A realistic nationwide tax program for logged off lands which will encourage private owners to recrop and keep these lands under an active reforestation program.

5. Greater recognition of the importance of highly specialized forestry personnel, both in government depart-

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ments and private fibre-using industries.

In conclusion, I would like to quote a statement by Colonel W. S. Greeley, nationally recognized forester who, in his new book entitled "Forest and Men," says:

"The cycle of forest growth, harvest and use goes on, the first old trees are gone, but the forest is here to stay."

Let us back up these words by actions so that ensuing generations can look upon this generation as the one which, to a great degree, helped to solve our nation's forest problems.

Metal Allocation

L. E. Hill, Jr.

Pulp Division, Weyerhaeuser Timber Co.

Abstract

Industrial freedom of development is now restricted by shortages of metals. These arise in part from developments already in process, which obligate large quantities of material; in part from added demands to supply high level economy; and in part from depletion of ore deposits or restriction of trade.

These factors restrict free use of steel, tungsten, cobalt, copper, aluminum, nickel and almost every other alloying element. A dog-eat-dog purchasing scramble would upset production of military supplies, therefore application of controls was necessary. This took form as a system of single level D.O. priorities.

Industry advisory groups working with National Production Authority try to avoid arbitrary decisions harmful to essential production. An example of such action is brief on fourdrinier and cylinder wires requiring copper alloys.

Single level priority system breaks down when too many claims are recognized, as by allowance for M.R.O. requirements.

Limited application of Controlled Materials Plan will be started in third quarter. Assembly of staff for administration required time. When operating, defense production will be assured necessary steel, copper, and aluminum. Essential civilian production is also included but alert use of alternate substitute materials will be necessary. Difficult job of management will be aided by frank disclosure of government's planned actions.

There are remarks, almost endlessly repeated, that such a project would be undertaken if the materials could be obtained. The object of this talk will be an informal exploration into the reasons for our present plight. In doing this the technique will borrow from the work of the correspondent who knew most intimately what was happening in Hitler's Germany by reading the newspapers and then integrating bits of real information into a comprehensive total of preparedness for war.

Demand is a major factor in this situation, and very little reading is required to gain some conception of what is happening to the American economy. We cannot take the time to do more than touch upon a few items, but they will show the trend.

Reading the Paper Mill News for May 12, we come to an announcement of the new paper machine which Bagley and Sewall is to build for Continental Can. The wire width will be 270 inches, trim 250 inches. The machine is to be designed for a speed of 1500 feet per minute and production of 600 tons per day. The machine will weigh 4,000 tons. Here we have a figure which will influence the supply of metals, but everyone in this group realizes that this is only a part of the project.

A machine of this size must have its own enormous building with reinforcing and structural steel. The stock preparation system and piping will add to the requirements, as will also the power plant and water filter auxiliaries. Raw materials and finished product require storage space and materials handling equipment, which will be made from iron and steel.

The energy and control of such equipment in a modern mill is supplied by electricity. Copper conductors encased in magnetic sheet steel or steel conduits place a large demand upon the suppliers of this material. Is this demand coming only from the pulp and paper industry? Many other reports of additions, expansions, and new plants are reported which in the aggregate amount to a very handsome award to suppliers and the construction industry.

The same effort to improve facilities becomes evident at every turn. The steel industry, in order to expand production, must first build plants. The materials for such construction reach imposing totals which tend to dwarf the project mentioned above, and demand "supporting" projects which in themselves are major efforts.

In one issue of "The Iron Age" is an announcement of construction of 40 new coke ovens at the Merchant Coke Plant of the Great Lakes Carbon Company. In the preceeding weekly issue is a photograph in color of a bank of 65 ovens just completed by the Koppers Company for Inland Steel company's Indiana Harbor Works. Numerous recent photographs have shown ships which were "stretched" by adding additional cargo space in the middle. The point to be made of all of these announcements is that they require steel and other metallic construction materials, and most of them do not add immediately to our production. Many of them in fact will add to the metals consumption through providing shop room for production of military items.

The demand would be bad enough under the best of circumstances. I am no keen student of politics, but know enough to give our world situation a very different classification than *"best."* A large part of the world is unable to trade with the remainder. Currently the most acute supply situation is to be found in our tungsten income. Most of the imported tungsten has been coming from China and Korea. There is obviously no mining in Korea at this time, and we are properly trying to decrease the Chinese trade with the rest of the world rather than trying to build it up. Tungsten is used of course in lamp filaments, in high speed steel for cutting tools, and in tungsten carbide cutting tools. For some of these uses we can work out substitute materials if necessary, but whenever substitution is mentioned we should remember that usually a vast experimentation has been responsible for selecting a metal such as tungsten for its various jobs. In order to encourage tungsten supply a five-year price guarantee of $63 per ton of domestic mined concentrate has been announced. I am sure any tungsten miners sitting relaxed in the

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* Presented at the 32 Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Multnomah Hotel, Portland, Ore., June 24-28, 1951.

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audience will rush out to their diggings as soon as they hear the good news. But not many have tungsten diggings and the word concentrate seems to indicate that two world wars have taken the high grade ores out of the earth.

A mention of tungsten brings immediately to mind a partner element, cobalt. The metallic carbides of tungsten, titanium, boron, and perhaps others which enter into cutting tools and dies because of almost diamond hardness are obtained as small crystals or particles which become useful only after being bonded together by a metal which combines strength, toughness, and a satisfactory melting point. Cobalt is generally used for this purpose, as well as being a constituent of the alloys of the aluminum-nickel-cobalt pattern which form the super-magnets. Such magnets replace electro-magnets in many installations which range from television receivers to industrial sizes for tramp iron removal. Since cobalt is a scarce element which has entered in greatly increasing size into our technology, its users will compete for the available material. It is perhaps available in normal amounts but is scarce in terms of greater demand.

The same picture applies to copper, but in this case the use of copper is far more intimately associated with everyday materials than is cobalt. Anyone who is interested in a longer account than can be given today should read the article in the May issue of "The Westinghouse Engineer" or the one in the May 21 issue of "Electrical World." Some highlights from this article may be mentioned, although with small comfort. In 1950 the domestic production was 940,000 tons. Ninety-three percent came from five western states: Arizona, Utah, Montana, New Mexico and Nevada. World production of copper outside of Communist areas adds about 1,600,000 tons to the United States production, but comes principally from Chili, Northern Rhodesia, Canada, Belgian Congo and Mexico. Although in antiquity copper was recovered as native metal from rock formations, at the present time such deposits are largely exhausted and the metal is released from sulfide or oxide ores after such ingenious applications of mechanics, physics and chemistry that ore deposits containing as little as twenty pounds per ton are being operated at present prices.

Copper production in the United States has followed the ups and downs of the economy, but in good times has not been able to go much beyond a ceiling of production capacity which has been fairly constant for the past thirty years. It is during these good times that the use of copper has exceeded the domestic supply, forcing users to import from other producing countries. The world demand is also tuned to times of heightened activity in manufacturing and trade, with the result that when copper users of the United States are most actively looking for copper for import they encounter the greatest competition from other countries.

Study of use for copper indicates a rising demand per capita, with consumption in 1950 somewhat over 1,440,000 tons. A little over half of this was used in electrical and communications equipment—40 million appliances completed in 1950 used 100,000 tons of copper and copper alloys. Automobiles used 137,000 tons. The building industry used a similar quantity. Military uses are on the upswing, and will require vast amounts for airplane, tank and truck components and for shell and case manufacture. Since any effort to increase our production will require new facilities of a most complex sort, requiring about three years for completion, it is evident that the present situation will call for an adjustment in civilian economy to care for the rising military demands and the new manufacturing plants necessary for production of war materials.

The situation in the aluminum industry is oddly one which will require arbitration of civilian and military demands, and is beginning to get it on a political level. In this case the experts must be confounded, for the expansion in aluminum production capacity which took place during World War II was expected to leave capacity far in excess of any peacetime use for aluminum. At the present time additional capacity for aluminum is one of the spectacular stars in present industrial expansion. Reynolds Metals is building a new plant at Corpus Christi and will probably produce at a rate of 325,000 tons in 1952. Kaiser is building near New Orleans a plant which will have four pot lines, and has placed a contract with Consolidated Western Steel Corporation for building and equipment items requiring 26,000 tons of steel. Aluminum Company of America (Alcoa) has recently completed a novel plant on the Gulf Coast which generates electricity with internal combustion prime movers, and now will build a new plant near Wenatchee, Washington, which will use power from the Rock Island plant of Puget Sound Power and Light and non-firm power from Bonneville lines. With these and other developments U. S. production in 1952 should total 1,400,000 tons annual rate.

What happened? Of course, airplanes are again being built but certainly not at any such rate as that. Did you notice the item which reported the use of 2,000 tons of aluminum in the new liner SS United States? Or hear of the man who fabricated aluminum window frames — unessential, of course—who was restored to good standing when it was found necessary to get his frames in order to complete a barracks job? How many have seen the blaze of reflected sunlight from distant aluminum roofs, particularly from an airplane? It is obvious that aluminum is used for far more articles than saucepans or measuring spoons.

The aluminum producers use bars of their pure metal for electrical conductors in their plants. Power companies use cable made of aluminum conductor and steel tension member to replace copper in transmission lines. Farmers use it for siding as well as roofing. Consequently when military items are manufactured from aluminum we must either reduce other uses or expand production. Fortunately in the case of aluminum and magnesium it is possible to expand production, for raw materials can be obtained at the expense of added processing and transportation facilities. New facilities do not stop when ingots are produced. New rolling mills and extrusion presses are being built or planned to take care of the extra metal which will soon be manufactured.

Hardly any alloy for low temperature can be produced without nickel. It is a constituent of most of the corrosion resisting alloys, and is used pure for resistance to strong caustic. Almost all of the nickel consumed in this country comes from the International Nickel Company mine in Canada, where mining is today using the last of the open pit surface ore and is rapidly shifting to an underground operation which will supply all of the ore in a few years. During this transition period it is not possible to add to the rate of ore production. Some other deposits are known, but have not been brought to the state of supply that they are of much use in the present emergency. The economy must be adjusted to an ore production rate which was 9.8 million tons in 1950, will be 13 million tons in 1953 when the shift to underground is completed, and will be in-between at present. Production of the metal is expected to be 10,000 tons in 1951. Some one will have to do without nickel alloys.

The same variations in this picture of scarcity apply to other metals. Molybdenum is extremely critical, but apparently urgent demands arising from the defense program are more to blame than is the lively upswing of civilian business. Ditto for columbium. Titanium ores are available in good volume, but facilities for production of the metal must be expanded before it will be freely available as either an alloying ingredient or for the numerous promising use-situations recently discovered. Tin imports reflect a tight world market wherein those who have the tin are interested in the new high prices. The zinc demand has stepped on production heels for some time, but the lead suppliers are only now beginning to feel an increasing pinch.

A few years ago we heard of expediters: there were a number of derisive and ribald stories about them. The laughter which expediters provoked was not sufficient to disguise a very real fact of much importance to management, that extraordinary effort is justified in order to obtain synchronized arrival of all of the com-

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ponents to a job. Expediters went after the items which might have arrived late if they showed up at all. We have always had expediters, although not always by that name. We have not always been blessed with so many potential scarcities all at the same time.

As any one could plainly see, the metals stage was set some time ago for each industrial manager, each purchasing agent, each construction engineer, and each defense plant manager to release upon the world a swarm of expediters. The confusion which would result from such a process staggers even a super-toughened imagination. Obviously if any military production was to be achieved it would either have to have the best expediters or would have to have first call upon the necessary materials. That, translated into the Latin, is a priority. Translated into the current Potomac dialect is either a directive or a defense order.

Some parts of the military program were considered sufficiently urgent to require directives to producers, to set aside immediately any and all components which might be necessary for such production. All to the good, if that meant guns or bombs or trucks for our troops in Korea. But from where we sit, our admiration of the process is less warm when the directives clamp onto the entire national stock of some essential without giving a hint of the end use, or even an announcement that a directive had been employed. A lot of rumors are going around which accuse the National Production Authority of building up the stockpile too rapidly, or being too generous in filling the storerooms of a defense plant prior to its start. Certain it is that some defense materials have suddenly become scarce far in advance of the production of finished guns or tanks.

A second or lower level of priority is to be found in the defense order or D.O. system. Take any number from one to one hundred, put a D.O. in front of it, and the symbol is likely to represent a class of production which is considered worthy of priority assistance. At first a few numbers were assigned, and suppliers were instructed to honor requisitions bearing the D.O. rating up to some specified percentage of their total business. This was at the beginning a relatively small fraction such as one-fifth or fourth. But as more firms began to contribute to the matter of actual arms work, others who made their raw materials found it necessary to obtain materials and were in turn granted some priority assistance.

There is of course justification for some differential treatment. The difficult decisions require far more intimate knowledge of the workings of the industrial complex than can possibly be found in a relatively small group of men who have been hurriedly summoned to Washington. Fortunately many of the problems could be handled by following the lessons of the recent war, and key people in each industry were able to follow through. The petroleum industry called attention to the vital necessity of oil well development and that it was dependent upon continued availability of oil well casings and drill rod.

In our own industry production is dependent upon ability of wire weavers to obtain material for fourdrinier wires and cylinder mold coverings. The American Paper and Pulp Association submitted a brief to NPA outlining the necessity for full allocation, if full production was desired, and included the quantity of material needed as well as the amount of salvage which return to the metal trade after such wires were worn beyond further paper mill use. Other surveys will be undertaken and briefs submitted as necessary, although the problems which can be handled in this manner must necessarily be of industry-wide application. The individual hardship case remains one for the particular mill to work out, even if it means that someone must go to Washington.

In order to keep firms with good purchasing departments and a cash balance from a policy of excessive advance purchases and large inventories of scarce materials, orders were issued which restricted purchases to a reasonable figure, which would result in relatively small inventories. Rumor is busy again with the word that this order has not been carefully observed. If that is the case, business is to some extent responsible for its own troubles and also for the strangulation of the D.O. priorities system. Toward such rumors we may take a fairminded business attitude that they are completely unfounded. The recent authorization of priorities for Maintenance, Operation and Repair seems to have restored equilibrium, for now everybody can go hunting for the material that may not be there with the comforting assurance that he has a priority too.

The allowance for MRO supplies which could receive a priority rating of D.O. 97 was based on a reference period during which most businesses had enjoyed substantially full operation. Those industries which were increasing their rate of operation through growth of sales of new products, and those who had been curtailed by strikes during the reference period, were allowed to make compensation in the amount of material that could be charged to D.O. 97. Since the dollar value was used as the unit of measure, increased costs of present materials automatically reduced the actual volume of goods for which priority could be claimed. Theoretically the system had a chance for operation, but practical difficulties appeared almost immediately. It is worth while to examine some of the practical obstacles, as they are liable to appear with any other system of controls.

All D.O. priorities are supposed to be of equal rank, and are supposed to draw from the percentage of production assigned for delivery to priority customers. In some instances the assigned percentage was inadequate for the volume of business claimed by D.O. requisitions.

A directive could step in ahead of all D.O. requisitions, and it must be inferred that some market shortages must be laid to so liberal a use of directives that the entire supply of some materials or manufacturtd articles was absorbed before it became available for defense order claimants.

Many who found that they could apply a D.O. rating for MRO had been using second best materials from the "free" market. For vital maintenance items the best is none too good, therefore it was good management to apply the D.O. 97 and try to get the scarcer material.

Customer channels still function, and where possible manufacturers are still attempting to do the best that they can for those who have made business pleasant in the past and will presumably be able to do so when things quiet down a bit. Therefore some processors are not now having much trouble in obtaining items which are very difficult for the casual or occasional customer.

Those firms that have used expediters find the technique useful in searching out hidden pockets of material which can be made to work, although it would not be the specification of first choice. Much of the success of automobile manufacturers in maintaining high volume production during the second quarter of 1951 should be credited to teamwork between discoverers of materials and engineers who apply them to the job.

For all of the above reasons and perhaps others which do not come to mind, the system of D.O. ratings has been bogging down. At the time of writing the preliminary moves are being instituted for partial application of the Controlled Materials Plan. Before defining this thing we will note what is meant by partial application.

Three metals are to be covered by the plan as it is proposed: steel, copper and aluminum. The big three enter into practically everything that is needed for defense of civilian use and will regulate production rate to the extent that their use is permitted.

Many but not all manufacturers will be given allocations of these metals. Thus any business which is producing goods not essential to either defense or to civilian well-being will have to get materials on the free market, if any; go out of business; or shift to defense business. The last course is to be desired, and has had many notable examples of success. To mention such a conversion, many jewelry manufacturers during World War II shifted to the manufacture of precision small parts for planes or instruments when unable to get the necessary ma-

terials for continuation of their normal production.

The Controlled Materials Plan allots the necessary quantity of material to a manufacturer who is producing a defense product or an essential civilian product. The amount allotted will be reconciled to all other allotments so that the sum assigned does not exceed the amount available for the period covered. (It is hoped that good coordination and prevention of hoarding will permit release of some of the material to those who do not qualify for allotments.)

Manufacturers who produce materials or products which fill defense contracts must submit their bill of materials for scheduled production, and will then be told how much steel, copper, or aluminum they have been assigned. The authorized assignment permits them to go to their regular suppliers with a priority. If the usual suppliers cannot provide, then the National Production Authority will find for the manufacturers a source of supply that will be obligated to furnish the essential material at the time required and in the amount necessary.

Other manufacturers who make materials for general distribution—the nuts, bolts, bearings and nails of trade, will similarly submit their requirements for the coming period, but do so to the division which has been set up to administer for that section of industry. Pulp and paper manufacturers go to the Chemical, Rubber, and Forest Products Bureau and within it find the Pulp, Paper and Paperboard Division. The appropriate division will participate in the overall survey of available supplies and anticipated demand, and emerge from this survey with the amount of material which can be assigned to such a manufacturer. Those who look to an industry division for their quotas and produce for general distribution are said to be making "Class B" products, and will find their output is included in the "Official CMP Class B Product List."

Manufacturers who produce on contract to the armed services are said to be making "Class A" products. If they subcontract some of their components they may pass on the necessary priority for the material involved, except when such material is Class B and of standard design.

The CMP is slated to begin operation in the third quarter of 1951. It requires a large staff for administration, consequently has not been activated before this time. Those experienced with its prior application expect one or two quarters will be required to smooth out most of the kinks, but that subsequently most of the administration can be assigned to the field offices of the National Production Authority, U. S. Department of Commerce and field purchasing offices of the Defense Department.

Such success is certainly desired, and may be achieved if it is possible to avoid the same troubles which beset the system of D.O. priorities. The greatest danger will come from group pressure aimed at administrators to assign more material than is available. When such overextension takes place there will again be the confusion that is so dangerous to the country's welfare.

In order to round out this discussion of the metals situation, the listener will be expecting some mention of substitution and use reduction. It is a large field and very interesting, and fortunately for all of us is already receiving active study. During World War II much work was done on production of steel shell cases which would replace the brass traditionally used. We now have tests being made on shell rotating bands of sintered iron powder to replace the copper which is conventional. More work is being done to control the use of boron as an alloy for steel, for successful application promises to produce a heat treatible steel with a minute fraction of one percent boron in place of several hundred times that amount of nickel, moly or vanadium.

Similarly promising work will substitute porcelain-coated steel for stainless or inconel in the manifolds of internal combustion engines, and a mixture of metals with ceramics as high temperature components, replacing the fancy alloys presently necessary. A process has been worked out for direct application of chrome plating, eliminating the usual copper then nickel base coats. Another reference mentions a possible electroplate with antimony to eliminate chrome plating altogether. And so it goes, a challenge to the researcher to devise the process and a challange to the alert mill man to broaden his contacts and his reading in order to profit from the best and latest information available.

In closing, let me quote from Tom Campbell's editorial in the "Iron Age" for May 10:

"About nine months ago defense officials were kidding the publice about what the defense program would do to our economy. They said that direct defense would take about 4 percent of the steel. Today they admit that, for some time, it will take 20 percent.

"They said nothing about defense supporting requirements some months ago. They pooh-poohed the effect of the defense orders on steel supply. Well, defense supporting items plus direct defense will, by June, take more than 50 percent of the steel supply; later it will take 75 percent.

"Business and the people want to know in plain, simple terms what their job is. Then they want to be saved from being hamstrung in trying to do that job."

What We Have Done to Remain Competitive*

Walter F. Wolfe
Superintendent, Mac Sim Bar Paper Co.
Div. United Biscuit Co. of America, Otsego, Mich.

The paperboard industry has been advancing very rapidly during the past few years. It has made many notable improvements, not only in the actual preparation of stock and the operation of the paper machine, but in every other phase of its business, from the receiving of the raw stock to the shipping of the finished product. Each of these improvements has been made for one or more of three reasons—to improve quality, to increase production of a saleable product, or to reduce cost.

Any company that has not kept pace with the industry as a whole will find itself unable to offer a product of proper quality at a competitive price and still make a fair profit.

One of the first and most basic steps taken by us was to increase the productivity of man power by mechanizing wherever possible. Baled raw stock is unloaded and handled by gasoline-powered fork trucks; the finished board is handled by electric lift trucks; rolls are handled by electric cranes; the maintenance crew is supplied with gasoline buggies to transport concrete, heavy tools, etc.; and in many other places about the plant, electric or mechanical power is now being utilized to assist the workmen.

We have greatly increased our raw

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stock storage space during the past few years. This means a definite saving in at least two ways: first, we can carry a higher inventory of waste papers which allows us to buy more advantageously; second, the extra space allows us to more carefully sort the various grades of waste and use them more efficiently.

We have modernized and increased the capacity of our beater room by replacing the filler beaters for one machine with a Hydrapulper (we are now installing a second Hydrapulper for the filler stock on the other machine); by installing cycling hydrating systems for the preparation of liner stock on both machines; and by otherwise rebuilding our beater room to supply the greater amount of stock of more uniform quality and consistency required by our faster running machines.

We feel that this is as far as we dare go toward the so-called "push-button" beater room which some types of mills have approached much more closely.

A large percentage of our raw stock is waste papers which sometimes contain such things as plastic glues, parchment, moisture-proof adhesives, wax, tar, latex, synthetic coatings, etc. Our beater engineers are magicians at detecting these materials and using the contaminated waste papers where they can do us no harm. Nevertheless, such foreign matter is occasionally so well hidden that it is not discovered until it is in the beater. In these cases, our small batch type of stock preparation permits us to get rid of the objectionable material with a minimum loss of good stock.

Our greatest single step toward keeping up with the industry was the complete rebuilding of our two machines. In rebuilding these machines, we incorporated a great many comparatively new ideas, but were conservative enough not to try out too many things that had not been already proven in other plants.

Several years ago, our company saw the necessity of being able to coat paperboard on the machine. To achieve this end, we first installed two Champion coating units on our No. 2 machine; and shortly thereafter, a Consolidated Coater on our No. 1 machine. This latter job has since been replaced by two Champion coating units and a section of twenty driers.

In the early stages of machine coating, we encountered many problems, each run seeming to bring up new ones.

We naturally thought that we could reduce our cost by covering up, with our coating, the lower brightness and other minor defects in a slightly inferior top liner furnish. This concept, unfortunately, is not true. In fact, we find that coating tends to exaggerate any imperfecton in the sheet.

The one fault in paperboard that shows up first when coated is poor finish. At first, we tried to get as good a finish as possible by unweighting our presses as much as we could. This practice, of course, gave us a better finish, but reduced our machine speed. In order to overcome this problem, we installed a smoothing press just ahead of the second coating unit. This press allowed us to again weight the wet end, increase our speed, and still get a much better finish than before.

I have seen smoothing rolls used as early as 1915 but with very little benefit to the sheet, and, in almost every case, a great deal of trouble. These smoothing rolls were nothing more than bare presses at the wet end. The rolls we have installed, however, are positioned almost half way through the drier section. They are hollow, chrome-plated rolls with cold water circulating through them. The water causes the rolls to sweat; which, besides helping smooth the sheet, eliminates the necessity of doctoring them. We have found these rolls to be of great value in giving us a smooth finish on all grades of paper, whether coated or uncoated.

In order to overcome the strong tendency of light coated board to buckle, we found it necessary to locate our coaters at the most advantageous point, to check our machine to be sure that all the driers were as near perfectly aligned as possible, and to eliminate all long draws.

In order to increase tonnage, we have, of course, found it necessary to increase our machine speed. To this end, we have rebuilt our drives, installed more effective press felt cleaners, relocated our wet felt showers, and have done many other things, each contributing a little toward higher speed.

Of course, there are other ways besides increasing speed to increase saleable tonnage. For instance, we have made time studies of the various crews making slitter changes, and have managed to save twenty or thirty seconds on each such change. Also, we have instituted a system of quality control that increases the production of saleable board by reducing the production of off-standard board.

The installation of an electronic caliper control unit has saved many tons of off-weight board for us. The machine that we have is unique among caliper controls in that it discriminates between a sheet that is out-of-level, and a sheet that is actually off weight. It measures the thickness of the web at front, middle, and back just before it enters the drier section; and, if it finds the sheet to be out-of-level, it makes no correction, but shows by a system of indicator lights what part of the sheet is heavy or light.

If it finds the sheet to be level but continuously off weight for a pre-set minimum length of time, it automatically corrects the condition by taking off or putting on filler stock. After making a correction, it will not make another one until the change has had time to pass the point of measurement.

The operator can adjust the tolerances at will by simply turning a small control knob. Also, by merely adjusting the hand-set pointer on the proper timer, he can control the length of time that the sheet must be continuously off-weight before a correction is made, the amount of stock put on or shut off by one correction, or the time lag after one correction before another can be automatically made.

In order to cut operating costs, we have tried, as much as possible, to reduce down-time due to mechanical failure to a minimum by a system of preventive maintenance, and by designing and locating equipment in such a way that repairs and replacements are made as simply as possible.

This report of our progress has been a very sketchy one, but I think it will give you a fair idea of what we have done to meet competition.

WASTE LIQUOR AS FERTILIZER

KAUKAUNA, Wis.—Field tests to find out whether spent sulphite liquor can be used to give bigger yields of corn and alfalfa are now going on as part of the sulphite pulp industry's research program to cut stream pollution. This by-product is being applied as fertilizer to 16-foot wide experimental strips of planted land on the Lehrer farm, Kaukauna.

Both types of sulphite liquor produced in Wisconsin are being tested. Two tank truck loads, totaling 2,400 gallons of spent liquor from calcium-base sulphite pulping, were first spread on test strips in one of Lehrer's corn fields before the first sprouts appeared. A 1,250-gallon load of ammonium-base sulphite liquor was spread in another planted corn field on Memorial Day. Now scheduled for spreading are 1,200 gallons to be applied on strips in an established alfalfa field as soon as the first cutting is completed.

Corn needs a good deal of nitrogen, which many farmers provide by fertilizing with ammonium nitrate some weeks after the corn sprouts. The experimenters at Kaukauna hope that ammonium-base sulphite liquor may supply nitrogen in form useful to the growing crop. Alfalfa requires sulphur for its best development and the current tests are intended to show whether the sulphur compounds in spent sulphite liquor are in a form available to these plants.

QUALITY CONTROL COURSE

RALEIGH, N. C. — A five-day short course in statistical quality control as applied to wood product manufacture will be conducted in the School of Forestry at North Carolina State College, September 10-14.

The course is designed primarily for executives, production managers, engineers, superintendents, quality control managers, chiefs of inspection for wood industries, and others with similar interests.

Recent Developments in Hydraulic Barking*

Meder Johnson

Manager, James Brinkley Co., Seattle, Wash.

This report on hydraulic barking supplements the detailed report given by L. P. Hill, Jr., at the 1949 meeting of the Superintendent's Association. Since then, there have been no revolutionary additions to the large family of barkers, but some of the barkers, which were quite new at that time, have been in operation long enough so that their advantages and potentialities can be appraised.

Most impressive of these developments are the Hansel Ring Barker and the Simons Rotary Head Barker. These barkers account for the majority of new installations now being installed. Both of these barkers remove the bark as the log passes through the barker in a direction parallel to its axis. The log is not rotated and the barker is not hindered in barking crooked or very long logs. As the logs can be fed end to end, there is no time lost between logs. The water reaction is almost neutralized as the jets are opposite each other and there is little tendency to dislodge or move the log, making the use of hold down rolls unnecessary. The forward travel is slow and sudden acceleration or deceleration of heavy logs is unnecessary — which simplifies the feeding equipment.

The ring barker was originally conceived and patented by Frank Swift of Crown Zellerbach who built the first barker at Camas, Washington. The ring barker, as the name implies, consists of a continuous rotating ring with nozzles mounted on the inner periphery through which jets of water are directed against the log as it passes through the center of the ring. To supply the water at pressuers as high as 1400 p.s.i., it is necessary to provide huge rotary seals at the outer ends of the periphery. This offered a tremendous sealing problem and gave so much trouble on the experimental barker that progress was slow until Bloedel, Stewart and Welch, in search of a barker for their Port Alberni mill jointly undertook to develop the ring barker. They were assisted in this project by the Hansel Engineering Company which is now licensed to manufacture the barkers in Canada and the United States.

The sealing elements consist of Micarta rings mounted in the rotating ring which seal against a chromium-plated stationary ring. The pressure between the Micarta and chrome-plated ring is very critical and must always be in a definite ratio to the water pressure. This was accomplished by mounting the steel ring in a channel in the outer housing and forcing it against the Micarta face with hydraulic pressure. This pressure is sealed by "O" rings which allow the seal ring to float freely against the rotating Micarta surface. The hydraulic pressure in back of the ring is maintained at a definite ratio to the jet pressure by a system of orifices and bleeders.

It is necessary to raise the pressure gradually when the barker is started to prevent the seals from overloading the rotating motor. This is accomplished by a motor-operated valve on the main water supply line. When full pressure is on the machine and the seals are adjusted, the seal friction is very low and water leakage is negligible. The nozzles, of which there are two or four, are slotted with the long dimension parallel to the log axis. The width of the slot depends on the quantity of water used.

Both inner and outer rings are very rugged and are very carefully manufactured to prevent any distortion. The inner ring is positioned by Micarta bearings and it is sturdy enough to resist damage when accidentally struck by the log. The operator centers the ring on the log by simple control levers, similar to an airplane joy stick. The seals are easily damaged by dirty water and the supply of water must be filtered so that nothing larger than 60 microns enters the barker.

As there is no limitation to the speed of rotation, it is possible to operate at the optimum barking speed which is found to be 25 to 30 feet per second. The rate of feed through the barker is affected by the tightness of the bark and the quantity and pressure of water used. Average feed rates are from 24 to 80 feet per minute. Water pressures from 1000 to 1400 p.s.i. are used with volumes of from 400 to 1000 gallons per minute. The Weyerhaeuser mill at Longview is installing a barker in which they contemplate using a very large volume of water and a high rate of feed.

Since the installation at the Port Alberni mill, the Potlatch Forest Industries at Lewiston, Idaho, has installed a 42" and a 70" barker, and the Weyerhaeuser mill at Springfield has installed a 70" machine. At present, ten barkers are under construction for installation in Canada and Northwest mills.

A recent improvement has been in the re-designing of the supporting mechanism so that most of the drive and positioning equipment is above the ring and away from the bark and debris. Continual improvements have been made on the seals so that long, trouble-free runs can be anticipated.

The Simons Barker, often referred to as the "lawn sprinkler type," utilizes two sets of rotating nozzles, one above and one below the log. The nozzles are set at the end of the horizontal branches of a "T" and incline towards each other to form an apex angle of approximately 14°. As the "T's" rotate about the vertical branch, the jets of water generate two cones. The log passes horizontally through the cones and the jets remove the bark from the entire circumference.

While it is generally accepted that barking is most efficient if the stream of water is perpendicular to the barked surface, in the Simons barker, the streams strike the log at all angles up to a tangent on the side. There is considerable over-lapping on the sides of the log, however, and the barking seems to be effective at whatever angle the water strikes the lob. On small logs, the jets miss the log on part of their travel and on large logs, the stream does not cover the entire circumference and the log must be indexed and passed through again. It is apparent that the optimum barking efficiency is achieved on a particular log diameter relative to the nozzle spacing and for other log diameters the efficiency may be reduced. In spite of this, the over-all efficiency of the barker seems to be comparable to other barkers.

The lower head remains in the same position, but the upper head is raised and lowered to accommodate different log diameters. As there is no limita-

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tion to the height to which the upper head can be raised, it is possible to install this barker directly in the mill log haul without restricting the size of logs that can be handled. Such an installation can be seen at the Canadian White Pine Company, Ltd., Vancouver, B. C. With the barker in the log haul, it is not possible to re-circulate the logs to remove any remaining bark. This is not too serious in a saw mill as any slabs having bark on them can be sent to the hog or mechanically barked. The log haul installation is much less expensive than the usual hydraulic barking set-up and brings the barker within reach of reach of many saw mills that would not wish to install the usual more elaborate set-up.

The ring barker also lends itself to log hauling installations as the ring can be retracted to allow an over-size log to pass. At the Chemainus mill on Vancouver Island, a Simons barker is installed on a roll case parallel to the log haul with provision for indexing and re-barking over-size logs. This barker handles logs up to 80-feet long with no trouble and bark removal is excellent. At the Nanaimo sulphate mill on Vancouver Island, which often operates on very small logs, it has been found that two or more logs can be barked simultaneously.

The Simons barker is very ruggedly built and maintenance is relatively low. The rotating heads are very rugged and the nozzles are shielded by a smooth circular casing which protects them from damage by the logs. High pressure water is fed through the center of the rotating shaft by a double packing gland assembly which neutralizes the thrust. The pressure on the packing is reduced to about ½ the water pressure by bleeding off water between the packing and a long bushing which throttles the water as it passes between the shaft and the bushing.

The heads are driven by variable speed 15-horsepower DC motors. Average rotating speeds are from 120 to 180 RPM. The rate of speed through the barker varies with the amount of water and pressure used, but the range is from 60 to 120 feet per minute.

The barker does not require particularly clean water and for most water supplies, a wire mesh strainer is sufficient. As with the ring barker, there is no limitation to the speed of the water jets. Both barkers use approximately the same jet speed.

The Simons barker uses round nozzles which are located in several positions on the nozzle arms and are arranged so that the inner and outer nozzles can be easily plugged off in order to utilize the spacing that is most efficient for the current range of log diameters. Water pressure generally ranges from 1000 to 1400 p.s.i. The quantity varies from 400 to 1200 although there is no practical limit on the quantity as the more that is used, the faster the rate of bark removed. There is no advantage of barking the wood faster than the mill can process it as the barker will then be idle part of the time.

Since Mr. Hill's report, a number of Bellingham-type barkers have been installed. The performance of this barker has been proven by many million board feet of barked logs. Sumner Iron Works, at Everett, Washington, manufacture the barker in a range of sizes. The smaller sizes are put out as package units that come complete with all auxiliary and control equipment except the high pressure pumps. On the smaller models, the nozzle positioning and control equipment has been greatly simplified. At the present time, Sumner Iron is building a very large unit for installation at the Weyerhaeuser saw mill in Everett to bark up to 42-ft. long and 84" diameter logs. The practicability of handling long logs in this type of barker has often been debated, but the results of the Everett installation will establish the actual facts.

The Bellingham barker is one of the simplest and most trouble-free barkers. Against the Ring and Simons barkers, it has the disadvantage that the jets are idle for an unloading and loading period. However, the over-all efficiency of the barker is good.

It is very difficult to accurately compare barking efficiencies as it must be put on a horsepower per square foot of bark removed to be of any significance. Also, different species of wood are much easier to bark than others. Most mills keep records of a total log scale only and in many cases not all of the logs pass through the barker.

Among the most popular round barkers now in use there seems to be no large difference in efficiency. The decision as to which barker is best for a mill installation must generally be decided by other factors than the efficiency from a water and power consumption standpoint. Power cost in the Northwest is very low and the cost of the power consumed by the average barker is approximately equivalent to the wages of two men. When this is contrasted to the tremendous savings of wood and man power, it can be seen that the hydraulic efficiency of the machine is not a serious factor.

At the Crown Zellerbach mill in Port Angeles, the cutter head on the Stetson-Ross barker was replaced by an oscillating nozzle which directs a stream of water against the bark face of 500 at 1200 p.s.i. At first, the oscillating mechanism gave considerable trouble, but this has now been re-designed and the operation is very satisfactory. The mechine has a capacity of 8,000 to 11,000. While it is obviously desirable to bark logs before breaking them down, on installations such as this where most of the wood has to be broken down for the grinders, the conversion of a mechanical barker to hydraulic offers tremendous wood saving at a moderate cost.

An interesting variation of the ring barker is the oscillating ring barker user on small wood at the Rayonier mill, Port Angeles. The barker has five nozzles set in a ring with their axes converging at the center. The ring oscillates through an arc of 80° so that the nozzle streams cover the entire log surface as it is fed through the center of the ring. The bark is effectively removed, but the barking efficiency is lower than the ring barker as it is not practical to osciallate the ring rapidly enough to achieve maximum jet efficiency. Also, there is considerable over-lapping of the stream pattern. The main advantage of this barker is the relatively low cost as there is no sealing problem, the water being fed into the ring manifold through a swing pipe. Hence, it could be used in small saw mills where production rate is low and first cost is of prime consideration.

The most significant trend in hydraulic barking has been the installation of barkers in saw mills with the result that the waste wood is bark-free and usable for pulp wood. Chips and barked wood are in great demand and sell at a price that makes the installation of barking equipment very attractive.

The potential supply of chips for pulp manufacture from this source is tremendous and the utilization of this waste wood will greatly reduce demands on existing timber stands. Mills that have developed such sources of waste wood have found it very worth while and often have been able to obtain a very large part of their wood requirements with the consequent conservation of their own timber stands.

After visiting one of those saw mills where one sees clean, bark-free logs being loaded on the saw carriage and the entire contents of the refuse conveyor discharging into chippers and the chipper conveyors bulging with clean chips, it is apparent that the sawmill industry is on the brink of one of the most revolutionary changes it has ever undergone. It is a change that will bring greater returns to the mill operators and will extend our timber resources, once thought dangerously low, many more years into the future.

FIGHTING PAPER WANTED

Invitation to Bid has been issued by the New York Quartermaster Procurement Agency, 111 East 16th Street, New York 3, N. Y. on QM-30-280-52-8, covering Paper, Tissue, Type A (Untreated) Size 21 x 32" White, 1,230 Reams; and Towel, Wiping Paper, Size 20 x 20", (Approximately 4250 Sheets To The Box) (Approximately 50 Lb. Box), 3,700 Lb.

Bids will be opened August 3, 1951, at 11:00 A.M. (EDST) at the New York Office. This procurement is for the U. S. Navy.

Is the Superintendent a Salesman*?

William Beckett

Executive Vice-President, Beckett Paper Co., Hamilton, Ohio

The subject of my remarks, "Is The Superintendent A Salesman?," was assigned to me during the course of some apparently innocent correspondence from Mr. H. R. Russell, the slick-talking co-chairman of your program committee. It was not until sometime after I had complacently accepted this assignment and had begun to give the subject a little thought that I realized I had been put in the position where, if I asserted that the superintenent is indeed a salesman, I might cause a mortal resentment in the minds of many salesmen as well as many superintendents who may be jealous of the difference that exists between them. Nevertheless I intend to commit myself without reservation to the proposition that the superintendent is a salesman in certain very important respects, or else he is not a very good superintendent. Any salesman or superintendents who wish to object to being identified in this manner will have to settle their differences among themselves in private with weapons of their own choice. It is the purpose of this presentation to treat the question in general terms without respect to particular cases.

There are several broad areas in which the superintendent must be active and influential if he is to be successful. In laying down this premise I have in mind the superintendent according to the familiar and, I hope not yet old-fashioned ideal of a superintendent, who is the chief operating officer of his mill and who is responsible for all operations. He is the good right arm of the general manager and is in close working positon with the other functionaries of the mill responsible for cost control, personnel, engineering, and maintenance, safety, job-training, traffic, purchasing, control and research laboratory, and sales. The heads of these various divisions may or may not be responsible directly to the superintendent, but in any case there is an intimacy and closeness of liaison between them which is indispensable to the effective performance of the organization operating the mill. In any organization successfully operating a modern paper mill, the superintendent is a central and vital element regardless of whether he carries the actual title of superintendent or of production manager or of mill manager or anything else. He is the man whose job it is to create and maintain a delicate balance of harmony, mutual endeavor, coordinated effort, and singleness of purpose among all the other principals of the organization. It is a grand responsibility and is being grandly performed in a very large number of paper mills in this country today.

Let us see within what area and in what manner a superintendent can, by resorting to the techniques and devices of a salesman, make his job more effective and more pleasant for everyone.

In any sizable organization, the superintendent will have a number of subordinates who in turn are responsible for small elements of the entire operation—such as stock preparation, paper machines, finishing, etc. These subordinate department supervisors together with the heads of some of the other principal functions mentioned a moment ago constitute a group with whom the superintendent must be on the most cordial terms of intimate understanding.

Although this group should constitute a close-knit unit of planners and administrators individually devoted to their various functions, all of the operating facts, problems, and plans of each department should be discussed by the entire group in order to achieve a perfect understanding and to permit the application of the greatest number of competent minds to the solution of problems common to all.

As I have remarked in the past few minutes, the superintendent is very likely to be the leader of this group and should make it his business to assemble them regularly and frequently for orderly and organized study and discussion of all problems relating to their functions and departments. There should be statistical reports of the result of operations during the time elapsed since the previous meeting, and the responsible supervisors and department heads should be prepared to analyze and account for important deviations from previous standards, or from a realistic goal previously agreed upon. There should be free and thoughtful discussion of every aspect of labor relations and of general management policy with respect to mill operation.

The superintendent's job in a meeting of this character is to lead the discussion, to stimulate the flow and expression of ideas, to moderate the group in case of differences between individuals, and finally, to give clear and positive expression to decisions arrived at. His decisions will have the force of directives to the subordinate supervisors and department heads; and it is at this point that we begin to recognize how important it is for the superintendent to address himself to these other men as though he were a salesman, whose princpal concern is to convince the other parties of the value and desirability of the thing he is talking about, and at the same time make himself as personally agreeable as it is possible for him to do without becoming over-familiar.

A good salesman when he is addressing himself to a customer or a prospective client must always be sensitive to the mood and disposition of the persons he is addressing, and he must be able to modify and temper his discourse to the capacity and preference of the customer or prospect. He must be able to employ the style of speech and the vernacular which will be most attractive to the other party, and he must in all cases speak with conviction and sincerity. His word must ring with assurance and belief in what he is saying because what he is saying is intended to and must inspire his listeners to a similar belief, or he fails entirely to do his job.

Surely, in a situation of this kind, a superintendent, addressing himself to his associates—who are in effect minor superintendents in their own realms—must be a model of discretion, logic, persuasion, tact, consideration, information, and restrained authority. He must, in enunciating policy to this group, sell it to them rather than impose it upon them; or they will not sincerely and unreservedly accept it and pass it on to the people in their departments for the good of the company.

The superintendent has many matters to attend to beyond the direct organization and supervision of those people who are directly subordinate to him, and who in turn must carry out his instructions and directives and fulfill his policy in managing the employees of their several subordinate departments. One of the most important qualities of a good superintendent is leadership; and he must be regarded as the leader by every employee, whether his job and responsibilities are important or

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modest. All employees must see him frequently and hear him sufficiently to know him, to trust him, and to admire his methods. Surely this can be so only if the superintendent has carefully studied the salesman's approach to these people and has subtly, without making it appear so, won them to him so that he to them represents the management of the company they are working for.

The superintendent must have many friendships and close acquaintances among the great body of employees, and he must by the maintenance of a sufficiently intimate contact with these employees understand their attitudes, their hopes, and their preferences. He must build up in their minds an understanding of the principles on which his company conducts its business and the terms and regard with which it treats its employees. The superintendent must —not only by using the department supervisors as his emissaries but by personal selling — convince the employees that their company is a good company to work for, their product and their customers are on the highest level of quality, and that he, the superintendent, is himself immensely enthusiastic about the whole business.

Once again, we see the salesman's technique at work; because it is axiomatic in selling that nothing can be sold with false enthusiasm or feigned confidence in the commodity which is being sold. Here we have a superintendent who, because he believes his company is honorable, able, and performing an essential function in the economic system, is able to convince the employees that ths is so; so they, in turn, will attack their work with enthusiasm and produce the things the company sells at a cost that permits it to sell competitively and profitably.

We have considered how necessary it is for the superintendent to be a high-grade salesman in his dealings with his direct subordnates, the department heads and supervisors of his organization, as well as the employees in general. We must not forget his relations with his own superiors who are the principal officers of the company and the stockholders. Every superintendent knows how difficult it is to maintain a progressive plant, to install new and better machinery, and to institute improved methods without the support and confidence of the principal managers and owners of the mill. These parties, who are naturally inclined to be conservative and even critical must be sold; they must be persuaded, and having been persuaded, the value of what they have been sold must be demonstrated, so that the next time they will have confidence, and the next time after that even more confidence, until the superintendent occupies the enviable position of having the complete confidence of the people who employ him.

Here again. we see a procedure which is perfectly analogous to the process of selling. In selling, it is not sufficient to make one sale based upon a glib and eloquent oral appeal. If the sale is based only on this, and the produce or commodity or service does not satisfy, there will never be another sale; and the salesman-customer relationship will be severed without further ado. In the case of the superintendent, this situation is fatal and puts him out of a job. Obviously, then, the superintendent must first argue logically for what he proposes to do, and then having been granted authority to do it, he must demonstrate that it was a wise course to take. This is the art of sellng in its highest form.

There is, finally, a fourth major area in which the superintendent can perform very valuably as a salesman. There are many occasions when a superintendent can and is likely to meet the customers of his company either in his own mill or when travelling to investigate paper trouble that may be reported by printers from time to time. If the customers have come to the mill for a visit, they are very likely to meet the superintendent, who will show them through the plant and explain the various operations. This is an excellent opportunity for the superintendent to inculcate confidence and respect for the mill in the mind of the visiting customer, and at the same time establish and foster a good personal relationship with the customer.

In my observation, it has always been true that a good customer likes the feeling that he knows personally the principal heads of the mill from which he is getting paper, and this is particularly true in the case of a superintendent. Most buyers of paper know very little about the actual process of papermaking, and it gives them a feeling of comfortable security to feel that someone they know and trust is producing the paper whose quality they can vouch for when promoting the sale of this product among printers.

I know a number of cases where superintendents have been invaluable in helping the members of the selling staff build up a strong and appreciative relationship with important paper merchants, and even with individual printers in certain cases.

The same qualities of personality, particularly with regard to tact, modesty, and quiet authority that serve the superintendent so well in his dealings with his subordinates, equal associates, and superiors, can also make him attractive to the company's customers and thus greatly strengthen and enhance the company's selling position. The discussion of technical problems with non-technical customers can be performed particularly well by a superintendent who has schooled himself to use straightforward, simple English in describing intricate mechanical and chemical processes. This is a great art and should be cultivated by every superintendent, and I can assure it will pay off many fold.

If anything I have said is in any degree stimulating or informative to any superintendent, or has the effect of suggesting to him ways in which he can improve his relations within his own organization and with the customers on whom his company depends, I will feel well rewarded for the journey this presentation entailed. More than this, I am grateful to the Association for its wish that I should come here to discuss with you a question of great interest to us all.

Thank you very much for your courtesy.

FIRE PROTECTION MEETING

(Continued from page 60)

set off in trucks. Each worked down to the river, set up its pump and laid its hose. The object was to fill five barrels with water. The barrels were strung up the hillside for some 800 feet. The progress of the teams in fighting their respective "fires" was continuously reported to the camp by radio from the helicopter and was broadcast over loud speakers to the delegates. Eighty points were given to the team which filled its barrels first. The other teams received one point less per minute they were behind the winner. Twenty points were given for neatness, efficiency, safety measures adopted, and other factors.

There followed a demonstration of water bombing from the helicopter. Waxed paper lined paper bags about one foot square were filled with water and dropped with considerable accuracy. It is one method of stopping or retarding small fires. A man with a fire pump was lowered by winch from the helicopter as it hovered some fifty feet above the ground.

W. A. E. Pepler, manager of the Woodlands Section, Montreal, spoke on means of lessening the fire hazard in pulpwood cutting operations by breaking up areas of logging slash. He suggested zoning of areas so that no large continuous sections of slash develop and be a fire hazard. This could be done by leaving belts of green timber, or patch cutting to permit the disintegration of slash in 5 or 10 years, or creating man-made zones to facilitate fire-fighting. Mr. Pepler discussed arguments concerning these methods. Conditions will prescribe which of the methods to adopt. Perhaps a combination of all of them would be most effective.

Mr. Kingston commented that logging slash fires are the toughest to fight. He considered the most important feature of the meeting was this discussion on ways of lessening the fire hazard. Fire in slash on cut-over areas which some people consider relatively unimportant is most damaging, he said, because it may destroy 30 to 50 years growth.

J. B. Matthews, vice-chairman of the Woodlands Section and Chief Forester, Abitibi Power and Paper Co., Toronto, expressed the appreciation of the Woodlands Section to the James Maclaren Co. for acting as host company and for the hospitality extended by all its staff to the delegates at the meeting.

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Stainless High Alloy Steels—Current Developments Affecting the Pulp and Paper Industry*

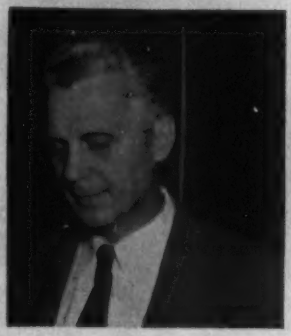
J. M. Wilcox and James T. Gow

Electric Steel Foundry, Portland, Ore.

Abstract

The commonly used designations for the different grades of high alloy steels are explained, with particular emphasis on the difference between the wrought and cast grades. Tabular data are listed for the most commonly used types. The sources for supply of the various elements and raw materials which go into high alloy steels are given, and the present availability or scarcity is mentioned. Substitutions of more readily obtainable alloy steels for those grades which are now difficult to obtain are suggested for both acid and alkaline pulping processes, as well as mildly corrosive applications. Mention is made of the industrial production capacity of both wrought and cast grades of high alloy steels as they exist today and a prediction for the future is given. Specific pulp and paper applications are discussed such as maintenance and repairs, sulphur conservation, expansion of production, and the stream pollution program.

* Presented at the annual convention of the American Pulp and Paper Mill Superintendents Assn. on June 28, 1951, in Portland, Ore.



James T. Gow

Most of you are familiar with the various grades and types of high alloy steels but, for those who are not, we might explain briefly that the designations of the American Iron and Steel Institute are those most commonly used for identification of the wrought steel grades. These A.I.S.I. type numbers are of three digits and range from the

TABLE I.

Wrought Corrosion-Resistant and Heat-Resistant Alloys

AISI Number	Nominal Chemical Ranges, % C	Mn (Max.)	P (Max.)	S (Max.)	Si (Max.)	Cr	Ni	Other
301	Over .08-0.20	2.00	.040	.030	1.00	16.00-18.00	6.00- 8.00	
302	Over .08-0.20	2.00	.040	.030	1.00	17.00-19.00	8.00-10.00	
302B	Over .08-0.20	2.00	.040	.030	2.00-3.00	17.00-19.00	8.00-10.00	
303	0.15 max.	2.00	...	...	1.00	17.00-19.00	8.00-10.00	P, S, or Se .07 min.; Zr or Mo 0.60 max.
304	.08 max.	2.00	.040	.030	1.00	18.00-20.00	8.00-11.00	
305	0.12 max.	2.00	.040	.030	1.00	17.00-19.00	10.00-13.00	
308	.08 max.	2.00	.040	.030	1.00	19.00-21.00	10.00-12.00	
309	0.20 max.	2.00	.040	.030	1.00	22.00-24.00	12.00-15.00	
310	0.25 max.	2.00	.040	.030	1.50	24.00-26.00	19.00-22.00	
314	0.25 max.	2.00	.040	.030	1.50-3.00	23.00-26.00	19.00-22.00	
316	0.10 max.	2.00	.040	.030	1.00	16.00-18.00	10.00-14.00	Mo 2.00-3.00
317	0.10 max.	2.00	.040	.030	1.00	18.00-20.00	11.00-14.00	Mo 3.00-4.00
321	.08 max.	2.00	.040	.030	1.00	17.00-19.00	8.00-11.00	Ti 5xC min.
347	.08 max.	2.00	.040	.030	1.00	17.00-19.00	9.00-12.00	Cb 10xC min.
403	0.15 max.	1.00	.040	.030	0.50	11.50-13.00	.....	
405	.08 max.	1.00	.040	.030	1.00	11.50-13.50	.....	Al 0.10-0.30
410	0.15 max.	1.00	.040	.030	1.00	11.50-13.50	.....	
414	0.15 max.	1.00	.040	.030	1.00	11.50-13.00	1.25- 2.50	
416	0.15 max.	1.25	...	...	1.00	12.00-14.00	.....	P, S, or Se .07 min.; Zr or Mo 0.60 max.
420	Over 0.15	1.00	.040	.030	1.00	12.00-14.00	.....	
430	0.12 max.	1.00	.040	.030	1.00	14.00-18.00	.....	
430F	0.12 max.	1.25	...	...	1.00	14.00-18.00	.....	P, S, or Se .07 min.; Zr or Mo 0.60 max.
431	0.20 max.	1.00	.040	.030	1.00	15.00-17.00	1.25- 2.50	
440A	0.60-0.75	1.00	.040	.030	1.00	16.00-18.00	.....	Mo 0.75 max.
440B	0.75-0.95	1.00	.040	.030	1.00	16.00-18.00	.....	Mo 0.75 max.
440C	0.95-1.20	1.00	.040	.030	1.00	16.00-18.00	.....	Mo 0.75 max.
446	0.35 max.	1.00	.040	.030	1.00	23.00-27.00	.....	Ni 0.25 max.
501	0.10 min.	1.00	.040	.030	1.00	4.00- 6.00	.....	
502	0.10 max.	1.00	.040	.030	1.00	4.00- 6.00	.....	

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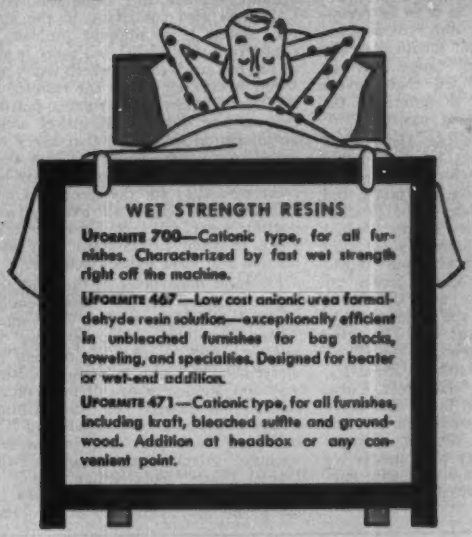

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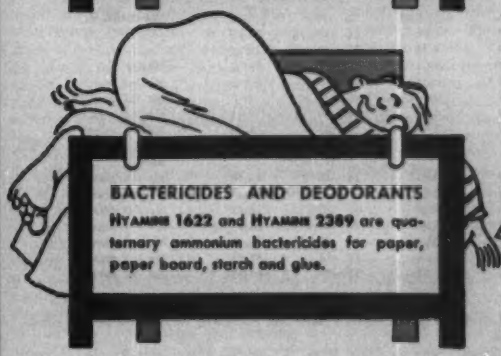

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300 series types up into the 500 series types. Table I shows the designations and chemical composition ranges for the most popular wrought stainless steels.

Those in the 300 series are the iron-chromium-nickel grades such as Type 304 (nominally 19 percent chromium—9 percent nickel), Type 316 (nominally 17 percent chromium—12 percent nickel — to 3 percent molybdenum), Type 309 (nominally 23 percent chromium—12 percent nickel), etc.

Those in the 400 series are mostly the straight iron-chromium types of stainless steels, with variations in carbon content and small additions of other elements but, except for a couple of special grades, without any nickel. These straight chromium alloys are ferritic and magnetic and are either hardenable or non-hardenable by heat treatment, depending upon composition, whereas the 300 series types are non-magnetic, austenitic, and generally not hardenable except by cold deformation.

The 500 series types are relatively low alloy steels, more closely comparable to the SAE types and not usually classified as true stainless steels by the accepted definition.

Most of the corresponding standard cast grades of high alloy corrosion and heat resistant metals, as designated by the Alloy Casting Institute, are covered by the American Society for Testing Materials' Specifications A296-49T and A297-49T. The designations and compositions of the cast alloys are presented in Table II. It is to be recognized that the cast alloy composition range is generally not identical to the grought composition range. It is, therefore, recommended that buyers use the cast alloy designations for proper identification of castings.

The principal alloying element of most stainless grades of high alloy steels is *chromium*, which supplies the fundamental oxidation resistance and passivity. Unfortunately, the production of chromium ore in the United States has been negligible except during the pressure of the two World Wars. The West Coast States of Washington, Oregon, and California contributed most of the domestic supply during World War II. The principal producing countries are the Union of South Africa, Southern Rhodesia, Turkey, and Russia. However, Cuba, the Philippine Islands, Japan, and India are also important producers. Fortunately, chromium is not yet in short supply in this country and, unless we get into all-out warfare, adequate supplies of chromium should continue to be available.

Nickel comes mostly from the Sudbury District of Ontario, Canada, where ores are found of sufficiently high grade to make their mining and refining economical. Cuba and New Caledonia also contribute to the supply. There is no shipping problem in connection with nickel, but there is one of production facilities which today are sorely overtaxed. This has resulted in the United States Government putting the existing supplies of nickel under an allocation system so that users receive only a percentage of what they require to fill their orders. It has become necessary for the steel mills and foundries to utilize all existing and possible sources of nickel-bearing scrap steels in order to maintain their production and meet today's demands.

Of great importance to the pulp and paper industry are the molybdenum-containing stainless steels. The United States contributes normally some 90 percent of the world's production of *molybdenum*. The production of Norway and Mexico is also of importance. About one-quarter of the United States production of molybdenum is a byproduct of copper smelting in this country. About three-quarters of the United States' molybdenum output is produced from the huge reserves of low grade molybdenite ore in Colorado.

TABLE II.

Cast Corrosion-Resistant and Heat-Resistant Alloys

Cast Alloy Designation (See Note A)	Wrought Alloy Type (See Note B)	Composition—per cent							
		C	Mn Max.	Si Max.	P Max.	S Max.	Cr	Ni	Other Elements
CA-15	410	0.15 max.	1.00	1.50	0.04	0.04	11.5-14	1 max.	Mo 0.5 max.*
CA-40	420	0.20-0.40	1.00	1.50	0.04	0.04	11.5-14	1 max.	Mo 0.5 max.*
CB-30	431	0.30 max.	1.00	1.00	0.04	0.04	18 -22	2 max.	.....
CC-50	446	0.50 max.	1.00	1.00	0.04	0.04	26 -30	4 max.	.....
CE-30	...	0.30 max.	1.50	2.00	0.04	0.04	26 -30	8-11	.....
CF-8	304	0.08 max.	1.50	2.00	0.04	0.04	18 -21	8-11	.....
CF-20	302	0.20 max.	1.50	2.00	0.04	0.04	18 -21	8-11	.....
CF-8M	316	0.08 max.	1.50	1.50	0.04	0.04	18 -21	9-12	Mo 2.0-3.0
CF-12M	316	0.12 max.	1.50	1.50	0.04	0.04	18 -21	9-12	Mo 2.0-3.0
CF-8C	347	0.08 max.	1.50	2.00	0.04	0.04	18 -21	9-12	Cb 8xC min., 1.0 max., or Cb-Ta 10xC min., 1.35 max.
CF-16F	303	0.16 max.	1.50	2.00	0.17	0.04	18 -21	9-12	Mo 1.5 max., Se 0.20-0.35
CF-16Fa	303	0.16 max.	1.50	2.00	0.04	0.20-0.40	18 -21	9-12	Mo 0.40-0.80
CH-20	309	0.20 max.	1.50	2.00	0.04	0.04	22 -26	12-15	.....
CK-20	310	0.20 max.	1.50	2.00	0.04	0.04	23 -27	19-22	.....
CN-7MCu	...	0.07 max.	1.50	**	0.04	0.04	18 -22	21-31	Mo-Cu**
HC	446	0.50 max.	1.00	2.00	0.04	0.04	26 -30	4 max.	Mo 0.5 max.*
HD	327	0.50 max.	1.50	2.00	0.04	0.04	26 -30	4- 7	Mo 0.5 max.*
HE	...	0.20-0.50	2.00	2.00	0.04	0.04	26 -30	8-11	Mo 0.5 max.*
HF	302B	0.20-0.40	2.00	2.00	0.04	0.04	18 -23	8-12	Mo 0.5 max.*
HH	309	0.20-0.50	2.00	2.00	0.04	0.04	24 -28	11-14	Mo 0.5 max.*, N 0.2 max.
HI	...	0.20-0.50	2.00	2.00	0.04	0.04	26 -30	14-18	Mo 0.5 max.*
HK	310	0.20-0.60	2.00	3.00	0.04	0.04	24 -28	18-22	Mo 0.5 max.*
HL	...	0.20-0.60	2.00	3.00	0.04	0.04	28 -32	18-22	Mo 0.5 max.*
HT	330	0.35-0.75	2.00	2.50	0.04	0.04	13 -17	33-37	Mo 0.5 max.*
HU	...	0.35-0.75	2.00	2.50	0.04	0.04	17 -21	37-41	Mo 0.5 max.*
HW	...	0.35-0.75	2.00	2.50	0.04	0.04	10 -14	58-62	Mo 0.5 max.*
HX	...	0.35-0.75	2.00	2.50	0.04	0.04	15 -19	64-68	Mo 0.5 max.*

* Molybdenum not intentionally added.

** There are several proprietary alloy compositions falling within the stated chromium and nickel ranges, and containing varying amounts of silicon, molybdenum, and copper. Such alloys are available from licensed producers only.

Note A. These are the Alloy Casting Institute standard designations. Designations with the initial letter "C" indicate alloys generally used to resist corrosive attack at temperatures less than 1200° F. Designations with the initial letter "H" indicate alloys generally used under conditions where the metal temperature is in excess of 1200° F.

Note B. Wrought alloy type numbers are listed only for the convenience of those who want to determine corresponding wrought and cast grades. Because the cast alloy chemical composition ranges *are not the same* as the wrought composition ranges, buyers should use cast alloy designations for proper identification of castings.

Again, however, production facilities are not sufficient to meet the demands, so that the Government has placed molybdenum under an allocation plan somewhat similar to that for nickel. By a recent NPA order, the molybdenum content in stainless steel products has been limited to a maximum of 2.5 percent by weight.

Our principal source of *columbium* is Nigeria, while minor amounts come from the Belgian Congo, Brazil, and Argentina. Columbium is in such short supply that the NPA has ruled it cannot be used except on D. O. priority rated jobs only. Its principal use is as a carbon stabilizer to prevent intergranular corrosion in stainless steels to be field welded, or used in applications where the metal will be exposed to temperatures in the carbide sensitization range.

Our high grade *manganese* ores come mainly from Brazil, the Gold Coast, India, and the Union of South Africa, so that water shipment is involved. Russia used to be an important source of supply. Domestic manganese ores come almost entirely from Montana. This source supplies about 10 percent of the United States' requirements. Here, again, the NPA has put manganese under an allocation system in order to protect our existing stockpile supplies of manganese ores.

The use of *titanium* in high alloy stainless steels made in this country has been minor. In these steels it serves as a carbide stabilizer in much the same manner as columbium. Its importance is definitely going to increase as the availability of columbium is reduced. The supplies of titanium for metallurgical uses in the United States come mainly from New York State, Florida, and Australia. Here, again, production facilities will have to be expanded rapidly to meet an increased demand.

Fortunately, a rather recent metallurgical development has helped to alleviate the shortage of stainless steel. In brief, it is that of the use of oxygen gas in electric furnace stainless steel melting operations. This advancement, fortunately, recently passed from the experimental stage to become an important tool by which to obtain carbon reduction and a degree of metal refining. It has, therefore, allowed the salvaging of larger quantities of stainless scrap than was formerly possible, for use in the production of new stainless steels. Certain possible contaminates such as lead and tin, however, must be carefully avoided in the scrap charges, as they may lead to serious trouble in casting production or hot rolling of the wrought stainless steel products. As a result of this development, worn-out stainless equipment, sheet steel clippings, and machine shop millings and turnings are serving as an increasingly important source of the critically short metals for new production.

Due to this country's expansion in carbon steel production and the shortage of nickel, both carbon steel scrap and stainless steel scrap are in very short supply and the prices have been driven upward to a very high level.

The steel industry, as a whole, is strongly urging the use of substitute grades of alloy steels in order to preserve those elements which are in short supply or on allocation. For example, the alkaline process pulp mills use Type 302 or Type 304 18-8 grades of stainless steel for the bulk of their requirements such as evaporator tubing, digester strainers and heaters, stock and white water pipe lines, paper machine save-all pans, stainless-clad storage tanks, recovery and causticizing piping, rust-resistant applications, etc.

To the best of our knowledge, there are none of these applications in which a straight chromium grade of stainless steel such as Type 430 (17 percent chromium) would not be quite satisfactory from the corrosion standpoint, and even Type 410 (12 to 14 percent chromium) would be satisfactory in some cases. The 18-8 grades are only a very little more expensive than the straight chromium grades, and it has been customary to use the 18-8 grades because of their better fabricating qualities. The straight chromium steels form less ductile welds; yet, by selection of the proper grade and careful welding technique, they can be used successfully. For example, a Type 430 stainless with 17 percent chromium is easier to weld and will provide a more ductile weld than a Type 410 stainless with 11 to 13 percent chromium. These straight chromium grades of stainless steel have one advantage over the 18-8 grades, in that their coefficient of expansion is practically the same as carbon steel, whereas the 18-8 grades have a coefficient of expansion about fifty percent greater.

In the sulphite acid pulping process, Types 316 and 317 grades of stainless steel containing molybdenum have been used successfully for those applications encountering the most severe corrosion, as from the cooking process or the handling of waste liquors. Unfortunately, there is as yet no known substitute for molybdenum which will produce the same corrosion resistant properties. Stainless steel Type 329 (containing approximately 26 percent chromium, 3½ percent nickel, and 1½ molybdenum), which is reported to have been used with considerable success in Europe for sulphite liquor heaters, has been suggested as a substitute for Types 316 and 317 as a means of stretching out and conserving existing supplies of nickel and molybdenum. Type 329 stainless steel has been little used in the industry in this country and, consequently, there is not much available in the way of data concerning its corrosion resisting properties. You will note that Type 329 is not shown in Table I or in most other currently published lists because of the few manufacturers who are producing this material.

Before the advent of the molybdenum-bearing grades of stainless steels, straight chrome-nickel grades were used with fair success in the sulphite pulp mills. For example, a steel such as Type 309 (containing approximately 25 percent, 12 percent nickel) will do a pretty good job. We know of one recent instance in a Northwest sulphite pulp mill where a 25-12 digester bottom blow fitting was removed after seventeen years of continuous service and still appears to have some service life left, although considerable corrosion has taken place. The disadvantage of such a grade of steel is that it requires slightly more nickel than an 18-8 type, but it would undoubtedly be the best substitute if molybdenum were completely unavailable.

The somewhat new extra-low-carbon content stainless steels are finding increased use in the sulphite pulp mills and the chemical industries in general. The wrought stainless steel grades Type 304-ELC and Type 316-ELC are produced to a 0.03 percent carbon maximum specification. The equivalent alloy casting specifications, Types CF-ELC and CF-M-ELC, generally call for 0.04 percent carbon maximum. These ELC steels were developed for two main purposes—i.e., (1) to be of use in equipment which would be field welded or hot formed without subsequently being heat treated to dissolve the carbides that were formed during such heat exposures; and (2) to be used in fabricated equipment that is required to be stress relieved and withstand severe corrosion conditions. As is well known, the ordinary grades of stainless steel handled in this manner would undergo precipitation of carbides at the grain boundaries, so that highly destructive intergranular attack may occur upon exposure to corrosive conditions. Since carbide precipitation is largely eliminated in the extra-low-carbon stainless steels, it is apparent that they should have superior corrosion resistance to the higher carbon grades after being exposed to heat in fabrication, by stress relieving, or when used in chemical equipment operating at elevated temperatures.

One reason for the present rapidly expanding use of these ELC stainless steels is the lack of avilability of stabilizing alloying elements such as columbium and tantalum, that will combine with the carbon in the form of a carbide randomly distributed in the structure so as to be harmless.

In other grades of low alloy steels for non-corrosive applications such as heavy duty machinery parts, the substitution of such elements vanadium and titanium for molybdenum will give entirely satisfactory properties for the applications and specifications required.

Where fabricated stainless steel pipe lines are expendable or unobtainable because of plate and sheet shortages, we can suggest the substitution of centrifugally cast stainless steel pipe which, generally speaking, will have a longer service life, although it is sometimes slightly more expensive due to the heavier wall thickness.

You are no doubt interested in what is happening to the high alloy steel foundry industry throughout our country today. Our observations are based on our personal contacts on the West Coast, as well as our Middle Western and Eastern contacts with the foundry societies, our customers, and our suppliers.

There is no doubt that we are going through a period of extreme shortages of raw materials and, in some instances, of special types of foundry and rolling mill capacity, although these appear to be more critical in the East. At the present time, the big defense program consumers of alloy castings are the aircraft industry, the atomic energy program, and the tank program. This tank building program is just now getting under way, and the full impact of its requirements has probably not yet been felt to its greatest extent. The shipbuilding program is quite minor as compared to that encountered during World War II when the foundry industry, as a whole, met these demands. Based on our experience in World War II, the foundry industry should have sufficient capacity to accommodate the existing defense work and domestic requirements unless we get into a high gear shipbuilding program which, we believe, might sorely strain the foundry production facilities of our country.

Our own business, as are most others, is being taxed to the utmost to keep up with the demands of our customers. The pulp mills are making repairs, replacements, and ordering spare parts at a much greater level than we have ever experienced during normal business times. This might be partly due to fear that new Government restrictions will make such purchases more difficult when they become imperative. Plant expansion and new plant construction, while maybe not at an all-time high, is also a big drain on the steel industry.

The restrictions on the use of sulphur have suddenly jarred the sulphite pulping industry into the realization that they must bring their plants up to top efficiency without further delay. Many pulp mills have been considering new equipment installations for greater efficiency for several years but have delayed doing anything about consummating these plans until now it may be too late. We have particular reference to such things as hot acid systems, SO_2 gas recovery systems, digester indirect cooking systems, etc.; and it is a pity that so many of the pulp mills have waited so long before deciding to put their plans into effect.

Another factor responsible for today's extreme demand on our available raw materials is the present pulp and paper shortage and existing high prices. It is clearly understandable that all the pulp and paper mills would wish to do everything possible in the way of minor changes, additions, etc., to bring their production up to a peak level.

The stream pollution problem seems to have resolved itself into a series of temporary measures which can be put into effect until such time as the necessary materials are available for plant construction and changes. Most of the known methods of reducing stream pollution involve the use of large quantities of high alloy steels, and it is obvious to all that these will not be available under our present industrial and economic conditions.

Present indications are that our Government is anticipating future requirements for expanded production of dissolving grades of pulp which might be converted to explosives. All-out warfare with today's more modern weapons would undoubtedly use many times the amount of nitrating pulps produced during World War II. It is quite probable, therefore, that the Government would give high priority assistance to any companies willing to install additional capacity which could be converted to the production of dissolving pulps.

Stock Preparation in Board Mills*

Lee E. Eberhardt
The Bauer Bros. Co., Springfield, Ohio

Introduction

Recent years have seen increasing acceptance of disk mills in all fields of stock preparation. This acceptance has been due to the following reasons:

1. The mills have found that traditional equipment is inadequate to efficiently produce grades of paper and board of a quality demanded by the trade during a transition period in which there is a continual quality degradation of pulp and waste paper available for conversion into paper or board,

2. The mills have seen the trend in other very efficient industries toward continuous processing and are applying equipment that will eliminate the inefficiencies of the traditional batch systems,

3. They have found that the disk mill provides certain pulp qualities and unique effects in addition to strength development that are desirable in production of a high quality end product.

Revolving disk mills provide an unconventional refining action that is presumed to be a combination of rolling, rubbing, agitation, and violent turbulence. This provides very little cutting of fiber when compared with a bar or knife action refiner. This is particularly true on board mill stocks where there is little or not plate or bar to bar contact. This is indicated by the fact that pulp refined to a given bursting strength in a disk mill is usually bulkier, freer and has a much higher tearing resistance than the same pulp prepared in a beater or jordan to the same mullen strength.

Design and Operation

The design of modern disk mills is illustrated in the accompanying illustration. *Figure 1* illustrates a single disk mill. Chips or other fibrous materials are fed in at the center of the mill and fiberizing or refining is affected as the materials pass outwardly between the revolving disk and a stationary plate. The design is elastic in that the stationary plate may comprise part of the case, or may be held by a non-rotating head.

In the "double disk" machine both disks revolve, but in opposite directions. In the machine shown in the illustration *Figure 2*, the raw material

* Presented at the 32nd Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Multnomah Hotel, Portland, Ore., June 24-28, 1951.

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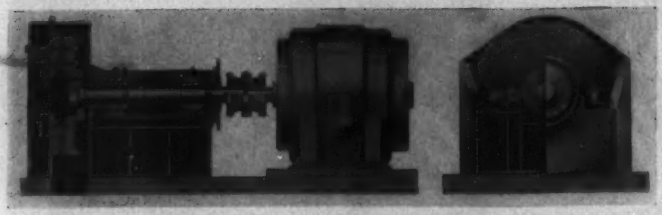


Figure 1

is fed into the fiberizing zone of the mill through the spokes of one of the rotating disks . However, the feeding may be effected through a hollow shaft, and this type of construction can also be used in the above-described single-disk mill, which is equipped with one rotating and one stationary disk.

The clearance between the plates is adjustable by mechanical, pneumatic or hydraulic mechanisms. In the units illustrated in *Figures 1 and 2*, the micrometer dial mechanism permits the control of the distance between disks by increments of 0.001 inch up to three inches; actual operations generally require settings in the range of 0.000 to 0.050 inch clearance.

Actual designs of various makes of disk mills may depart radically from those illustrated in *Figures 1 and 2*. The shaft may be vertical and time of retention of material between the disks may be regulated by pressure devices. But all disk mills incorporate the simple basic ideas above pictured.

Usually the disk and the stationary "heads" are provided with renewable "plates," which do the actual refining job and which may be replaced when worn. These plates are designed for a variety of applications and involve an endless variation of groove and tooth pattern and dimension. Plates are sometimes available in the form of full circles, but generally they are produced in segments constituting one-third or one-sixth of a circle. A few representative patterns of the many which are in current use are illustrated in *Figure 3*.

Choice of Equipment

Disk Mills are manufactured in a variety of sizes. Current models of single disk mills vary in size from 8" to 48" disk diameters with applied horsepower ranges from 5 H.P. to 600 H.P. Double disk mills range from 24" to 40" disk diameter with a H.P. range of 50 H.P. to 600 H.P. This indicates the wide range of disk mills that can be applied to all mill tonnages. The above figures are in no way limits in either design or capacity. The future will undoubtedly provide larger diameter mills with higher available connected horsepower.

Several generalizations based on actual applications and studies of refining characteristics of the two types of disk mills can be made.

1. Slow speed single disk mills do more mullen strength development with less defiberizing or deshiving than high speed single or double disk mills at the same horsepower per ton power input.

2. High speed single disk mills equipped with proper tackle do an excellent job of reducing size of coarse aggregates such as: Bull Screen Rejects, Baled Straw, Chip Screen Rejects, etc.

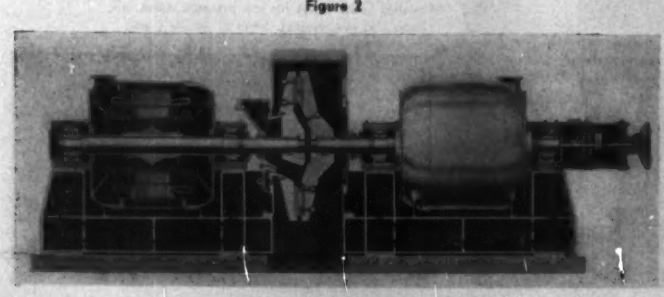
3. Double disk mills in one pass thru the machine defiberize uniformly and completely such materials as cooked chips, uncooked chips, and screen rejects.

4. Double disk mills completely fiberize and disperse fibers in pulp suspensions such as Breaker beater stock of pulp lap or waste papers.

5. Double disk mills resemble colloid mills in their dispersing action. In this respect they are used to do the following:

A. Disperse pitch and friable dirt in pulps.
B. Breakdown and disperse ink aggregates such as ink balls in de-inking applications.
C. To intimately mix dyes, etc., in pulp suspensions.
D. To disperse carbon black and compounds in rubber latex.

Figure 2



As previously suggested, for scientific knowledge of fibers, and of the effect of mechanical treatment on pulp, is too meager to serve as a basis for choosing the equipment best suited for a specified stock preparation. Any selection of Refiners and any recommendation of optimum conditions for the use of that refiner, must be predicated upon actual experience with a commercial sized machine. There are a great many controllable factors in both the design and operation of revolving disk mills.

Each factor has some profound effect upon the efficiency of operation

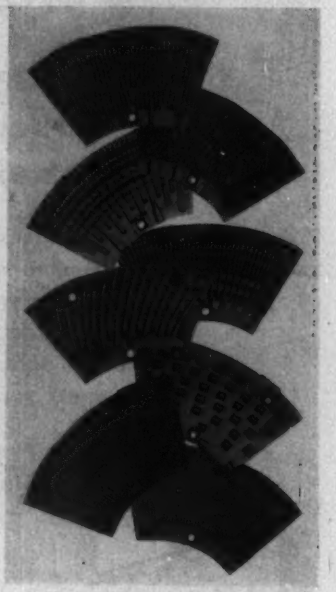


Figure 3

and upon the quality of product, which quality can vary widely in accordance with different treatments.

Among the principal variables are (1) the number of rotating disks (one or two), (2) rate of power application (3) speed of rotation (4) consistence of feed, (5) pattern of fiberizing plates (6) distance between the plates, and (7) precision of construction.

The effects of some of these variables are partially understood, but we lack the data and the theory needed to permit a prediction of the net effect of the combined factors upon the quality of product obtainable.

The choice of the proper design of machine and the selection of the preferred processing conditions must depend upon actual experience in preparing a specific type of pulp for a definite end use.

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The best experience is, of course, that gained in a producing mill under actual operating conditions. But this approach is entirely too costly except for a final demonstration after the main points have been cleared by a less expensive invesgative procedure.

The only reliable substitute for actual mill experience is a specific experiment in a laboratory equipped with a full sized revolving disk mill. A miniature disk refiner does not produce the same refining effect that is obtained with a commercially sized unit; the situation is similar to that which obtains between miniature and commercial beaters and jordans.

Fortunately revolving disk mills lend themselves well to a study of their refining action with small quantities of raw material. There are only a few ounces of pulp between the fiberizing plates of a disk mill at any one time, and as soon as the flow of stock into the mill ceases, the power consumption drops to the idling load of the motors. Such a situation produces very accurate laboratory information for evaluation.

The Bauer Bros. Co. together with several other equipment manufacturers maintain the Fiber-Products Laboratory at Springfield, Ohio, for the purpose of conducting semi-commercial tests and investigations on pulp and papermaking fiber using full size commercial machines. This laboratory has twenty-five years' experience in the applications of disk refiners to various phases of pulp preparation. Mills are invited to make use of this Laboratory for investigations of pulp refining, semi-chemical pulping or hardboard and wallboard projects.

Applications

Disk mills can be used and are being used in preparing a variety of pulps for conversion into a considerable number of different grades of paper and paper boards.

In the paper board field, the reworking of waste papers is of primary importance both from the standpoint of defibering and deinking. The traditional stock preparation system of breaker beater, beaters and jordans can achieve acceptable results only when used on very easily worked paper. Wet strength papers occurring in higher percentages in all grades of waste papers only serve to point out the inadequacy of the traditional pulping methods.

It is important that the waste paper must be thoroughly pulped and delivered to the paper machine with a minimum of chemical and mechanical treatment. It is also essential to keep in mind that in the original paper mill, this stock received sufficient treatment to allow acceptable paper to be made from it. Therefore to submit this waste paper pulp to additional beating and then cutting in a jordan, will result in a pulp that has been slowed to a point below the optimum level.

From this it would seem that the most efficient treatment for waste paper is one involving the maximum of violent agitation with a minimum of bar to bar cutting action. This effect can best be achieved with a double disk refiner operating at 1200 RPM with the plates operating at clearances up to 1.000 inches.

The most significant advantage of double disk treatment of waste papers is that of complete defibering of stocks in one pass through the Refiner. You are all aware of the inherent disadvantages of any cycling system in which some of the stock is overtreated and some may get no treatment at all.

In a high speed double disk Refiner it is not inconceivable that the relatively small amount of fiber between the plates at any one time insures practically equal treatment on the individual fibers. The relative peripheral speed of the two disks of a 36 inch, 1200 RPM double disk mill is 22,600 feet per minute. Under such conditions the resulting tremendous hydraulic shear to which the fibers are subjected insures excellent fiber separation and pliabilization.

One of the most important strength

TABLE I.

Disk Mill Refining Results on Typical Waste Papers for Board Mill Furnishes

New Material Refined	Treatment Before Refining	Pretreatment Chemicals or Additives	TP Days Per Ton	Air Dry Tons/ day Capacity 50 HP Machine	New Green ; GPL Freeness	Mullen, %	Tear, %	Degree of Defibering	Dirt Clots or Shives	Remarks
Old			4.0	75.0	148 cc.	18.7	68	Complete	Few Clumps	
News	Shredded	Hot Water	9.0	33.5	101	26.1	73	Complete	None	
	Agitated 1 Hr. at 200°F.	2% NaOH 1% Na_2CO_3 .02% wetting agent	16.6	18.1	38	40.0	81	Complete	None	50% Groundwood
Old Magazine	Shredded with cold water	1% NaOH	5.0	60.0	81	29.7	76	Complete	Some Dirt	100% Groundwood
Stocks	Hydra-pulper ½ hour	2% NaOH	2.9	103.2	180	42.6	114	Few Threads (cotton) not defibered	None	Mixed Magazines
	Shredded & cooked 1½ hrs. at 90°F.	2% NaOH 1% Na_2CO_3	6.0	50.0	98	37.3	92	Complete	None	McCall Covers
Kraft Waste Papers	Shredded & Steamed 1 hr. at 200°F.	None	11.1	27.1	510	70.5	245	Complete	Few	Old Potato Bags
	Shredded with hot water	None	8.2	36.7	473	78.7	274	Complete	None	Old Sugar Sacks
Old Corrugated Boxes	Shredded with cold water	None	4.7	64.0	580	65.5	281	Complete	Some Shives	
			6.4	46.7	393	75.9	230	Nearly complete	Some Dirt	
			4.3	70.2	491	68.4	240	Complete	None	
Blueprint Paper	Shredded & steamed ½ hr. at 210°F.	4% NaOH	6.7	44.7	65	57.6	142	Complete	None	NaOH not completely used up. Lower percentage should be sufficient.
			4.2	71.1	91	52.8	161	Complete	None	
			2.2	136.3	76	49.8	158	Complete	None	
Army Maps (Melamine Wet Strength)	Shredded & steamed 25 minutes at 200°F.	3% Alum	6.1	49.6	380	73.0	242	Complete	None	Refined with hot water at 180° F.
			7.0	42.6	371	76.8	236	Complete	None	
			8.0	37.7	402	68.2	221	Complete	None	
Mixed Ledger Stock	Shredded & soaked 10 minutes in hot water	3% NaOH	3.8	79.0	213	30.7	99	Nearly complete	Screening Necessary	Some sulfite posters in mixture of waste paper

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Oliver Wendell Holmes' story of the "Wonderful One Hoss Shay"? It was built by a deacon who had observed that most carriages broke down in one part sooner than the other. He vowed that he would build a carriage equally strong in all parts so that nothing would break first. He succeeded so well that the One Hoss Shay lasted one hundred years to the day.

The parallel is that our machines are equally well built in all of their component parts. You can expect long and unusual trouble-free service from a Rice Barton machine—the whole being a well-integrated piece of workmanship like the One Hoss Shay—without any weak part.

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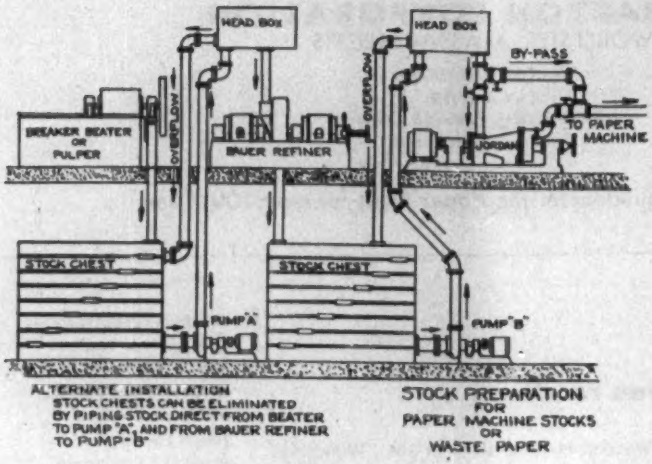


Figure 4

values of reworked paper is the tear value. Normally tear may be considered as a function of two components:

1. The average length of the individual fibers.
2. The degree of pliability of the individual fibers or ease with which a fiber may be broken when it is rigidly bonded to other fibers at various points along its length.

Point #1 has been proven by fiber classification studies that indicate a double disk mill with a positive clearance between the plates causes relatively little fiber cutting.

In reference to Point #2 the pounding that fibers absorb in bar to bar contact in a beater or jordan so injures fibers that although fiberlength classification does not show drastic shortening of fibers, when the sheet of paper is placed in a tear tester the bruised fibers are easily broken result in low tear test. In contrast the work that is done in the disk mill is due to hydraulic action, impact and violent agitation providing a pliable fiber which has not only its original length but also has few bruised sections to form weak linkages.

The action of the Refiner results in a stock with good bending qualities, excellent coverage, and high tearing strength. Another advantage of completely defibered pulp prepared with a disk mill is that good fiber loss in subsequent screening operation is practically eliminated.

In one case a mill using a double disk mill was able to reduce top liner caliper by 2 points while producing a more uniform appearing board. Excellent results are also being obtained in another mill on white and mist gray liners at relatively high tonnage rates per refiner.

Table #1 indicates results obtained in mills and Laboratory work on typical waste paper stocks found in board mills. It is interesting to note the relatively short cooking times and chemical percentages on the wet strength papers necessary to produce completely defibered stock by pulping in the double disk mill.

In all cases the tonnage rates of pulping were high for the grades refined. The strength and Freeness values are characteristic of disk mill operation.

Figure #4 indicates a stock preparation system for waste paper or paper machine stocks. The breaker beater is used to break up the stock for the refiner. It may also be used as a cooker by introducing steam on the backfall. Chemicals may also be used if required on the grade being prepared. The jordan may be used or by passed. However, the jordan following a disk refiner on an application as shown cannot cut the fiber as well as if the disk mill were not used. The resulting pliabilization of the fibers in the disk mill reduces the jordans bite.

One mill reports that a jordan following a disk mill as shown requires only one third the number of filling replacement as were needed prior to installation of the disk mill. This fact indicates some change in the refining action of the jordan on the stock following disk refining.

Deinking

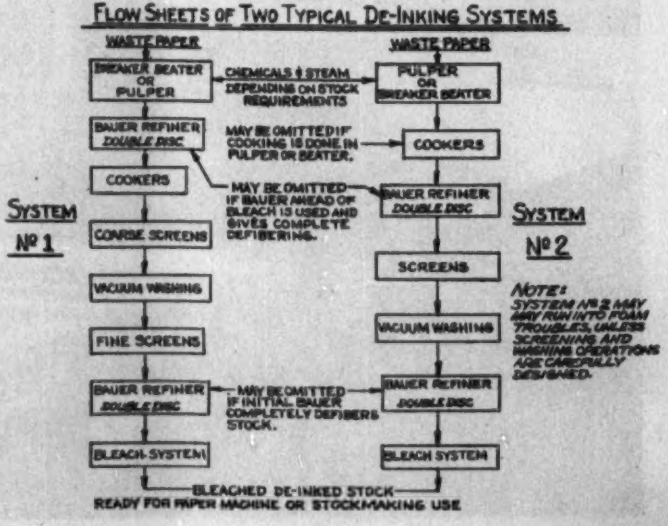
In the field of deinking of waste papers, disk mills have found excellent acceptance. The refining characteristics previously outlined have provided a means of reducing steam, chemical and time requirements in deinking while producing a cleaner sheet.

Disk mill refining produces a deinked defibered stock of uniform color, free of "ink balls" with the finely divided ink and dirt completely dispersed.

The symposium titled "Deinking of Printed Papers" published in June 1949 in the Paper Industry and Paper World covers the field very thoroughly. Reprints of this article are available for persons interested in this phase of mill operation.

Figure #5 indicates two flow sheets of typical deinking systems. From this it may be seen that disk Refiners are being used in two positions. Di-

Figure 5


FLOW SHEETS OF TWO TYPICAL DE-INKING SYSTEMS
WASTE PAPER
WASTE PAPER
BREAKER BEATER OR PULPER
CHEMICALS & STEAM DEPENDING ON STOCK REQUIREMENTS
PULPER OR BREAKER BEATER
BAUER REFINER DOUBLE DISC
MAY BE OMITTED IF COOKING IS DONE IN PULPER OR BEATER.
COOKERS
COOKERS
MAY BE OMITTED IF BAUER AHEAD OF BLEACH IS USED AND GIVES COMPLETE DEFIBERING.
BAUER REFINER DOUBLE DISC
SYSTEM Nº 1
CORSE SCREENS
SCREENS
SYSTEM Nº 2
VACUUM WASHING
NOTE: SYSTEM Nº 2 MAY ANY RUN INTO FOAM TROUBLES, UNLESS SCREENING AND WASHING OPERATIONS ARE CAREFULLY DESIGNED.
VACUUM WASHING
FINE SCREENS
BAUER REFINER DOUBLE DISC
MAY BE OMITTED IF INITIAL BAUER COMPLETELY DEFIBERS STOCK.
BAUER REFINER DOUBLE DISC
BLEACH SYSTEM
BLEACH SYSTEM
BLEACHED DE-INKED STOCK READY FOR PAPER MACHINE OR STOCKMAKING USE

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rectly following the initial disintegration or cooking step and just ahead of the bleach system.

In the first position, a stock is produced that is in excellent condition for the washing and screening operations. One mill using one Refiner in this position handles 140 tons per day with excellent results. In the second position, just ahead of the bleach, any fiber bundles or clumps remaining are completely defibered and any friable dirt or ink balls are dispersed, reducing that chlorine consumption to a minimum and reducing the hazard of over bleaching.

Conclusion

Modern revolving disk mills are new in stock preparation applications. The preferred conditions and optimum procedures for many potential uses are only sketchily understood and appreciated. But in the short time that such mills have been employed in refining pulp and waste papers for paper and board manufacture, they have shown distinct merit. Because of the great flexibility of treatment provided by the many controllable factors such as speed, plate design, consistence, etc., these mills promise to become a very important tool for stock preparation in the immediate future.

Preliminary Refining of Hot Stock Kraft*

Gordon Petrie

Sales Engineer, Shartle Bros. Machine Co.

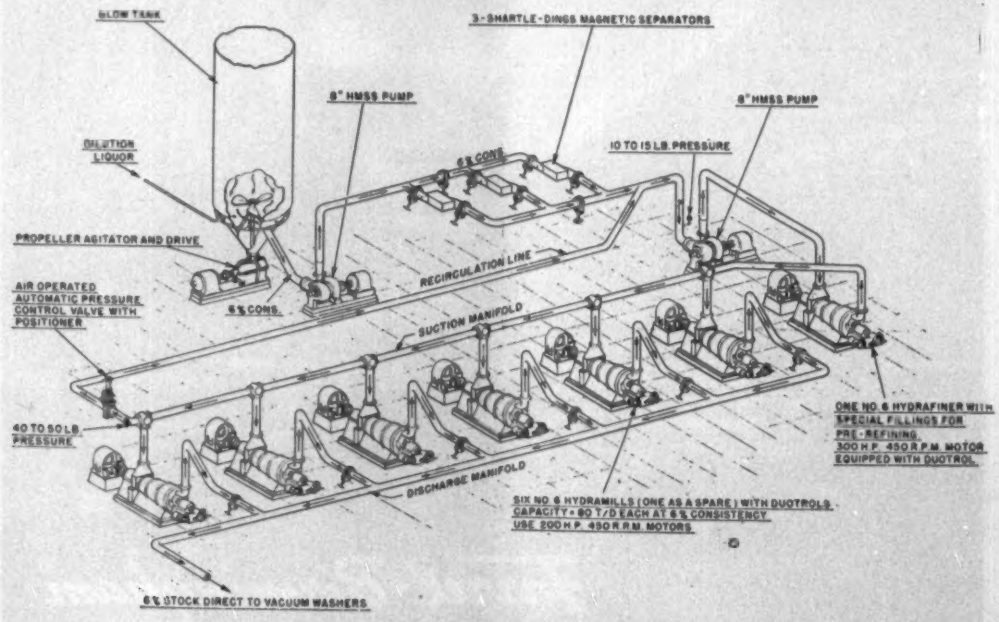
With increasing pulp demands and rapidly decreasing wood supplies, mills everywhere are faced with higher wood costs demanding that everything possible be done to economically give a higher pulp yield. It is our feeling that our "pretreatment equipment" is at least a part of the answer to this serious problem.

We have installed in a modern sulphate pulp mill pre-refining machinery to obtain maximum wood yield and greater fiber strength development. Improved mechanical treatment after the blow tank is variously referred to in the trade as "pretreatment" and "hot stock refining." The stock with hot liquor, blown from the digestor, is mechanically treated prior to washing stages. Our equipment being so used today has reduced cook time and chemical costs to more than justify the horsepower cost and the capital investment. Pretreatment machinery must uniformly prepare fibers for the washing stages, but not "prepare" objectionable material so that they will find their way into the finished pulp. Harsh treatment at this point in the system will give too great a drop in slowness rate of the pulp, resulting in trouble at the washers and finally a dirty pulp.

The Shartle Division of the Black-Clawson Co. has successfully installed pretreatment equipment which definitely develops strength needed for the final pulp, with higher yield thru proper pulp treatment. Extensive research in conical refiner filling design has given excellent commercial results with less horsepower per ton and less capital investment.

One outstanding advantage of the

* Presented at the 32nd Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Multnomah Hotel, Portland, Ore., June 24-28, 1951.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3-SHARTLE-DINGS MAGNETIC SEPARATORS
8" HMSS PUMP
8" HMSS PUMP
DILUTION LIQUOR
6% CONS.
10 TO 15 LB. PRESSURE
PROPELLER AGITATOR AND DRIVE
RECIRCULATION LINE
AIR OPERATED AUTOMATIC PRESSURE CONTROL VALVE WITH POSITIONER
6% CONS.
SUCTION MANIFOLD
40 TO 50 LB. PRESSURE
ONE NO. 6 HYDRAFINER WITH SPECIAL FILLINGS FOR PRE-REFINING 300 H.P. 450 R.P.M. MOTOR EQUIPPED WITH DUOTROL
DISCHARGE MANIFOLD
SIX NO. 6 HYDRAMILLS (ONE AS A SPARE) WITH DUOTROLS CAPACITY - 80 T/D EACH AT 6% CONSISTENCY USE 200 H.P. 450 R.P.M. MOTORS
6% STOCK DIRECT TO VACUUM WASHERS

400 TON PER DAY PRE-REFINING SYSTEM FOR KRAFT

Shartle pressure-type hot stock refining installation is the completely enclosed system which eliminates any foam troubles. Another advantage is the ability of the conical refiner to hold its plug setting constant which contributes greatly to the exceptionally long filling life.

Basic experiments in this field were conducted thru the use of the Shartle standard 36 Hydrafiner breaking unit with varied filling designs, but it was soon apparent that there was a definite demand for a distinct design of liner. For pretreatment applications we have developed what is known as the 36 *Hydramill* filling. With the special conical plug and shell filling design, it has been noted that greater clearance between the bar faces can be maintained and still obtain the desired results. By a greater bar clearance, we mean that the space between bar faces is greater in the conical refiner design than in the attrition mill design. This factor contributes greatly to the lower maintenance cost in replacement of liners and the lower horsepower requirements.

The complete installation as offered by Shartle starts with the blow tank agitator and goes to the first washer including pumps, valving and magnetic separators. A typical 400 ton per day system would require six 36 Hydramill refining units and one standard 36 Hydrafiner, prebreaker or the unit which would reduce the larger particles from the blow tank to such a size that they would readily enter the smaller working area of the Hydramills.

In the flow outline of our pretreatment system stock is cooked to a higher than usual permanganate number and is pumped after dilution to 6% in the blow tank thru magnetic separators at approximately 15# pressure. Then by means of a booster pump the stock is pumped at about 60# pressure thru at 36 Hydrafiner equipped with out standard cast chrome filling. The succeeding six 36 Hydramills are connected in parallel. To obtain uniform pressure within all refiners and to obtain the most uniform treatment, the inlet manifold of the six Hydramills only is arranged with a bypass or recirculating line, returning to the suction of the booster pump. This return line is equipped with an air operated automatic positioner valve. We recommend the use of six Hydramills with one of them to act not only as a standby in case of breakdown, but to act as a refining spare in case of pulp troubles. The extra refiner can be thrown into the line to maintain maximum tonnage when wood variations not corrected in the cook require more mechanical work. The refined stock is discharged into a common manifold leading to the washing stages and the stock at no time has had a chance to absorb air in this entirely closed system.

Each Hydramill, as well as the one Hydrafiner, is equipped with Duotrol plug adjustment assuring uniform stock treatment. The Duotrol holds the plug of the refiner constant at a predetermined setting to eliminate the necessity of an operator continually adjusting the plugs. From a single centrally located control panel the operator can make plug adjustments of all machines to suit the requirements of any cook.

Even though in this system the Hydramills have 1200 horsepower connected, the units will operate under full load at about 168 horsepower each. In calculating the horsepower per ton per day requirements of the system, the prebreaking Hydrafiner is not considered as additional horsepower because it is our feeling that it, or a similar machine, is required for all such systems. Nor is the sixth Hydramill figured in the calculation because it is not operated on a continuous basis. Therefore, by actual field test we have determined that our installation is using 2.1 horsepower per ton per day, while a different hot stock refining system is using 2.5 horsepower per ton per day. Although .4 horsepower saving does not seem great at first glance, it does, however, represent an annual power saving of some $12,000.00. This calculation is based upon the data from our files which indicate that 1 horsepower applied continuously for a year costs about $75.00.

Using this same installation comparison as previously mentioned, the TAPPI permanganate number was increased 2.2 points. This increased hardness of cook resulted in a soda saving of about 16 tons per day based upon 550 pounds of soda required per ton. At the same time screenings in this installation after the Hydramill were reduced from an average of .5 percent to .12 percent.

After obtaining, through months of field work, a great deal of detailed operational data on the Shartle pretreatment system, we feel that we have equipment which not only has the advantage of cost saving represented in higher yield, lower chemical costs, and lower power costs, but also operational advantages of an enclosed system with automatic remote control.

MAINTENANCE—VI OF SERIES

Operation and Maintenance of Lime Sludge Kilns*

W. H. Tock

Engineer, Process Machinery Dept., Allis-Chalmers Mfg. Co.

It is of prime importance to give care and consideration to the operation and maintenance of lime sludge recovery kilns to avoid costly chemical waste and disruption of balanced operation.

There are, at present, more than seventy operating lime sludge recovery kilns in the United States and Canada. There is approximately a fifty percent division between kilns equipped with

heat recuperating chain systems and those not equipped with chain systems. Of these lime recovery kilns operated in pulp mills, about twenty kilns are of the long multiple support type having more than two supports and over fifty kilns are the short or two support type. These kilns range in size from six to eleven feet in diameter and in various lengths to over three hundred feet long.

It is quite possible that at some time each of these kilns gave rise to some particular problem in operation and maintenance.

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While one might be dependent on the other, let us separately consider first, process operation and second, mechanical maintenance of lime sludge kilns.

Process Operation

The primary purpose of the rotary kiln is to reburn and otherwise waste products, lime sludge, continuously producing a high quality lime at a uniform rate on an economical basis with a minimum of equipment maintenance. This is balanced operation.

Many factors enter into attaining optimum process operation.

To begin with, uniform production of lime from a lime sludge kiln and uniform operating conditions and optimum fuel consumption can be obtained only if the kiln is fed at a constant and uniform rate with lime sludge feed of constant analysis and containing a constant moisture content.

It is essential and necessary at all times to be assured of a constant rate of feed to the kiln per revolution of the kiln.

In many cases the feed to the kiln consists of a pumpable sludge containing approximately 55 to 60 percent moisture. However, in most installations, a drum filter or a centrifuge installed just ahead of the kiln reduced the moisture content to 35 to 50 percent; and the lime sludge then consists of a cake which is fed to the kiln, usually through a water jacketed screw conveyor.

In many mills difficulty has been encountered in feeding the kiln at a uniform rate of lime sludge. This is due primarily to the inability to deliver sludge to the filter at uniform and constant rate. Control of sludge rate to the filter is attempted through various means with different mills arriving at a particular means considered most suitable. Some of these methods have been by means of a controlled pump, weir and weir-box, cake thickness gauge, and ferris wheel feeder which does deliver a constant volume of sludge to the filter.

While most mills do obtain a fairly constant flow of mud to the filter or centrifuge, constant attention must be given to these control methods to insure uniform flow and uniform feed to the kiln.

While there may be a control of volume of mud to a filter or centrifuge, this does not necessarily mean that the rotary kiln will receive a constant volume of cake per kiln revolution. Controls must be applied to insure a controlled flow or constant delivery of mud of uniform consistency to the filter or centrifuge.

While the consistency of the mud to the filter or centrifuge may be of an average moisture content over a long period of time, fluctuations in consistency which lead to irregularities in the volume of sludge feed to the kiln per kiln revolution will be reflected in erratic kiln operation.

This is brought out by the fact that the kiln may be divided into three zones; the drying zone which is the feed end of the kiln, the intermediate or preheating zone, and the calcining or burning zone. Any change or variation in consistency of the mud fed to the filter or centrifuge or any change or variation in the moisture content or amount of cake fed to the kiln per kiln revolution will upset operation or balance in all zones and can be counteracted only by constantly changing kiln speed or adjusting fuel flow. Either of these adjustments would, in turn, further unbalance each zone leading to continual fluctuations or adjustment of kiln operation. Such fluctuations or adjustments of kiln operating would give non-uniform exit and burning temperatures which are not conducive to production or uniform lime at best fuel consumption.

Variations in moisture content before and after the centrifuge and variations in the volume of sludge to the kiln per kiln revolution with the correspondent continual adjustment of kiln speed of fuel flow also can promote the formation of coatings, rings, or large balls.

Lime from most kilns is discharged in the form of dust-free pellets and a number of factors contribute to this product form. Among these are the moisture content of the feed to the kiln, uniformity of volume of feed per kiln revolution, the analysis of the feed, disintegrating action of the chains on the cake, and the rolling action of the sludge on the kiln wall.

It is a known fact that finely divided material can be pelletized with water in a rotating drum and this fact is utilized in other industries as a step in the process. Some cement plants pelletize raw mix ahead of a heat recuperating grate and kiln. The iron ore industry pelletizes as a means to reconstitute the finely divided iron ore concentrates from tachonite concentrating plants.

Pellets can be formed in most kilns with or without a chain system. However, in some cases, to form pellets and to prevent formation of a dusty non-pelletized product, kilns not equipped with chain systems must be fed with a sludge containing 55 to 60 percent moisture, thus increasing fuel consumption.

In chain system equipped kilns, the lime sludge as discharged from the chain system should have a moisture content of from 10 to 15 percent for best operation. Gases entering into the chain system will be at a temperature of approximately 1200 to 1400°F., and the lime sludge must be discharged from the chain system at this moisture content to protect the chain system, preventing oxidizing and disintegrating by the high temperature oxidizing gases.

This pelletized form of the lime sludge will be retained through the preheating and calcining zones unless it is caused to further agglomerate by the presence of excessive impurities, particularly soda in the sludge. Impurities can be controlled by proper liquor clarification, washing, and filtering operation. With respect to proper pellet formation and maintenance of this pellet form without additional agglomeration, coating, or ring build-up, experience indicates that for most operations, or average operation, the soda content as Na_2O should me maintained at approximately 1 percent of the dry weight of the sludge with the free lime content maintained constant at about 5/10 percent.

To evaluate reduction in moisture content through a chain system, samples should be obtained from sample holes located ahead of the chain system, just inside the discharge end of the chain system, and just outside the chain system to determine its moisture content as well as to obtain some visual picture as to what pellet formation is taking place.

In the event the sludge leaving the chain system has a moisture content of less than approximately 10 to 15 percent and the sludge sample appears to be breaking up to a dusty form, removal of a portion of the chain should correct this condition. Conversely, if the material sample appears to have constant moisture, considerably above the 10 to 15 percent, the addition of more chains would be indicated to accomplish further drying.

Sample holes in the kiln shell used for the purpose of obtaining lime sludge samples can also be used to determine draft losses across portions of the kiln during such times as there might be ring formations to locate the points of ring formation as an aid to overcoming such trouble.

The condition of the feed is a major factor in controlling the formation of over-size pellets or large balls. In the formation of these over-size pellets or large balls, more heat is required for average calcination. The outside of these lumps may be over-burned with the center core underburned all resulting in a low availability in the kiln product.

A high soda content in the sludge is the greatest contributing factor to the formation of large balls and rings within the kiln. With increasing soda content in the sludge, there is a reduction in the fusion temperature of the material within the kiln with which there might be an accompanying ring formation or agglomeration of charge to the lining in all three zones of the kiln. High soda content usually has a deleterious effect on kiln linings, particularly in the hot zone, materially shortening brick life.

However, dam rings, a hanging up in the chain system, or a back-spill of feed may occur in some kilns even though the soda content is held to a possible minimum below 1 percent. A change in moisture content of the sludge feed may correct this to cause a transition of drying in the chain system to eliminate these objectionable effects.

To correct persistent ring formation in any of the three zones, particularly

Kraft Round Table

Above right—Gordon Petrie; left—G. Gerett de Haas; Pictured at right—left to right—Russell Graff and Gerald Alcorn.

in the chain system or to overcome a back-spilling effect which is usually caused by the inability of the lime sludge to feed into the chain system, it may be necessary to further change the feed to better control the impurities. Certainly with such a noticeable and consistent trouble it would be well to run a continual control check of the feed to the kiln altering the conditions of the feed and noting the results.

With particular respect to back-spilling from the kiln, various corrective measures have been applied with or without an attempt to correct or change the conditions of the feed. Backspilling does not seem to be a chronic ailment of a lime sludge kiln, and the writer is aware of only two or three kilns wherein this gave an operating problem.

In these cases, attempts to overcome back-spilling involved the extension of spirals to the feed head, thining of the chain system in the feed end portion, the elimination of some of the chains in the feed end portion of the chain system, and the elimination of lining in the feed end portion of the kiln between the feed head and the start of the chain system.

With respect to ring formation, all other factors equal, small diameter kilns seem more prone to ring formation, particularly in the burning zone than do larger diameter kilns. The reason for this can be the greater arch effect inside a small kiln giving better retention of a ring formation in place against the lining. The smaller arch effect of the large diameter kilns will tend to cause agglomerating materials to fall away from the lining during kiln rotation thus minimizing ring formation. A periodic coating in the burning zone of the kiln usually can be removed by shifting the fire zone or stopping the fire for a short period of time, or by barring. I do not know of any adverse coating in the hot zone of any lime sludge kiln requiring a shut down to dig out such coating.

Considering ring formation or build-up throughout the kiln particularly in the chain system but also in the preheating section and calcining section sometimes a change in kiln speed or a change in the burning conditions can be employed in an attempt to overcome these problems/

In addition to controlled feed, the combustion of the fuel is of utmost importance in uniform kiln operation. For controlled combustion for any given rate of feed with given moisture content temperatures must be held uniform and the draft at the firing hood must be held constant. This can be accomplished through the use of a few essential instruments and controls, the most important of which is the draft controller. The draft controller will operate through the draft obtained at the firing hood to regulate the damper on the outlet of the exhaust fan or in the stack base to maintain this draft at the desired value for best operation. The usual draft at the firing hood will from 0 to .05 inches water column.

To properly record, interpret, and control the kiln operation, there should be available to the kiln operator a record of the feed end gas temperature, the burning zone temperature, the rate of fuel flow, and the draft at the feed end of the kiln and at the firing hood. Additional thermocouples can be installed along the kiln to obtain the gas temperature at any given point.

In addition, an instrument finding more and more use is the oxygen analyzer used to determine the oxygen content of the kiln flue gases as an aid to evaluation of proper combustion conditions. Using this analysis, the operator can balance the combustion conditions within the kiln consistent with efficient fuel consumption and best overall operation of the kiln.

An oxygen analyzer which analyzes a sample of the gases withdrawn from the feed end of the kiln operate to give an accurate analysis of gas conditions only, providing adequate attention is given to the sampling device to insure the withdrawal of a representative sample. The greatest trouble encountered with the operation of the oxygen analyzing equipment is in maintaining a clean sampling tube. Provisions must be made to provide for the periodic cleaning of this sampling tube, either by removal from the kiln or by blowing with air or flushing with water.

All instruments and operating controllers should be mounted on a central control board or cubicle located on the burning floor convenient to the kiln operator. The control panel should also include all necessary gauges, ammeters, voltmeters, and motor starter push button station.

Mechanical Maintenance

The continuity of operation of a lime sludge kiln requires strict maintenance control. The rotary kiln is among the largest type of moving machines made and is subjected to extreme temperatures, power stoppages, atmospheric and weather conditions, varying loads, and other operating conditions which affect its wear and alignment. It should be erected following a procedure precisely as outlined by the kiln manufacturer, or it should be installed under the supervision of the manufacturer's erecting engineer.

Even though great care has been taken in the design and the construction of the concrete piers, in some cases settling or tipping of the foundation can occur throwing the carrying mechanisms, bases, and rollers out of alignment. If this condition is not corrected, it will lead to continual trouble with the kiln shell and the riding rings and rollers. It is advisable when making the original installation of the kiln to establish bench marks away from the kiln foundation, checking the original alignment from these marks and rechecking periodically from these same bench marks to insure maintaining a constant alignment of the kiln; resetting the mechanism bases should any tipping of the foundation piers occur.

It is assumed that in the initial installation, the kiln is aligned perfectly with the kiln riding rings exactly between the centers of the carrying roller bearings. It is likewise assumed that there is a full bearing between the faces of the riding rings and rollers. It might be further assumed by some operators that once the kiln is

initially aligned properly that the carrying mechanisms should not be touched to change any alignment of the kiln. This certainly is not true and a kiln definitely must be adjusted periodically and checked at regular intervals to maintain the kiln in perfect alignment, particularly essential with a multiple support kiln and further so with a two diameter kiln having two different diameter riding rings to maintain it in perfect alignment and operating condition to avoid excessive or non-uniform wear between the riding rings and rollers.

Heavy localized loadings leading to adverse wear can be encountered if the rollers and riding rings do not bear across their full width of face or if the rollers are cut excessively.

The carrying mechanisms are equipped with screw lugs for roller and bearing adjustment. Rollers can be adjusted correctly through means of these screw lugs and the adjustment checked by inserting lead wires between the riding ring and rollers when they are rotating and measuring the thickness of the lead wire after it is pressed. In this manner the rollers can be adjusted to obtain full bearing across the face. Adjustments must be performed carefully to avoid excessive pressure and wear from developing on any one particular roller tire combination.

The thrust rollers are designed to carry the full down-hill thrust of the kiln with the riding ring and roller faces lined up for full bearing across the width. However, carrying rollers should be cut slightly to cause the kiln to float away from the down-hill thrust roller for at least a portion of each revolution to avoid the possibility of an excessive down-hill thrust existing which might be detrimental to the thrust roller. Even while there is apparently an equal force between the rollers and riding rings, there might be an excessive down-hill thrust due to slight inaccuracies in the surfaces of the carrying rollers and riding rings, or due to conditions which may have resulted from unequal loading in the kiln or warping of the shell in operation.

In aligning the kiln by adjusting or cutting the rollers, all rollers should be cut an equal amount rather than take all of the cut on one set of rollers. If all rollers are initially balanced proportionately than if one set of rollers only is cut to move the kiln in one direction, it is possible that another set of rollers could be cut to move the kiln in the opposite direction should the first correction be excessive. Such action continued would only lead to the various sets of mechanism rollers working against each other; and if this action is carried to extremes, misalignment could occur between any one set of rollers and the corresponding riding rings to give an unequal and aggravated wear between the riding ring and roller surfaces. It seems it would be a logical tendency on the part of operators to adjust only those rollers easiest to get to which would be on the discharge end mechanisms which are closest to ground level. Such action should be discouraged.

Stopping a kiln with hot charge, such as through a power failure, with no rotation of the kiln within a short while thereafter can lead to a warped kiln or a distorted kiln shell. It is difficult to return a warped shell to its original condition and operating a kiln with a bowed or warped condition will throw an adverse excessive load on the various mechanism piers. This is particularly troublesome in multiple support kilns and in two support kilns there is also aggravated conditions between the riding rings and rollers.

Sometimes a warped kiln can be returned to somewhat its original alignment by properly reheating the kiln on the opposite side from the warp to draw it back in line. Even at best, though, constant attention must then be given to the carrying mechanisms to provide an alignment which will not cause additional damage or adverse wear.

Sometimes the only way in which to correct a warped or bowed condition or misaligned shell is to cut out a portion of the shell, relining the riding rings and carrying rollers and then welding the shell section back in. This might give a slightly disjointed shell alignment but at least the items of major importance, namely the riding rings and rollers are then realigned.

The warped shell, of course, can lead to continual trouble with brick work giving a shorter or inferior brick life.

The best method of proceeding is to guard aaginst such conditions by taking steps in the original installation to avoid such trouble. This employs the use of a gasoline auxiliary drive engine which is operated during power failure to rotate the kiln at a slow rate of speed to avoid any distortion or warping of the kiln shell. For any type of kiln, either a two support kiln or multiple support kiln, the auxiliary drive is definitely good insurance which can be provided at a small additional cost on the initial installation.

The kiln drive is located close to the thrust ring to maintain the main gear and driving pinion in proper relation regardless of expansion and contraction of the kiln.

In the modern installation the main or girth gear, usually a spur gear is made in halves with full machined teeth to permit reversing of the gear to obtain a double life. The main gear is bolted to a gear ring flange which is welded to the kiln shell. The main driving pinion meshes with the main gear and is keyed to the low speed shaft of an enclosed gear reducer. The gear reducer is fixed to the foundation on the same slope as the kiln. The more recently installed reducers are provided with adjusting bolts and lugs on the reducer base plates to provide for adjustment or alignment of the drive. The driving motor is usually connected to the high speed shaft of the gear reducer by a multiple V-Belt drive.

The main gear as well as all other bearing surfaces should be lubricated properly in accordance with the kiln manufacturer's recommendation. The main gear and main pinion should be maintained in proper mesh. Improper meshing of the teeth causes many of the kiln mechanical troubles. A jerky or vibrating motion of the kiln may be caused by the improper meshing of the gear and pinion. Too close a tooth clearance will cause the main gear to ride in the base of the pinion teeth. Proper adjustment of the carrying rollers to compensate for the wear on the tires and rollers should avoid this condition; and furthermore in the newer installations the main pinion and reducer can be pulled away from the kiln by means of the adjusting lugs on the reducer and pinion bases. Proper clearance must be maintained at all times. Too small a clearance may cause bottoming of the gear teeth in the pinion teeth which will result in a scoring of the teeth on both gear and pinion and could cause a pinching action resulting in breaking of the pinion teeth.

If a minimum adverse clearance condition is allowed to continue with a resulting scoring of gear teeth and peening of pinion teeth, it will be necessary to reverse the gear pinion before such action is normally necessary and then reset the drive accordingly.

Misalignment of the kiln or pinion may also cause the teeth to wear to a taper resulting in inferior gear action and shorter life.

Present trend seems to be toward kilns having a greater slenderness ratio than formerly, that is a greater ratio of length to diameter. With accompanying higher speeds, we have in recent years encountered (or at least been made aware of the condition which did exist previously) a kiln vibrational problem. Large slow moving equipment such as the rotary kiln will have a low frequency of vibration which in many cases could, and has, coincided with a kiln speed in the operating range. When this occurs, we obtain a definite pronounced tortional effect which is reflected in an actual bouncing of the kiln on the supporting rollers and a knocking and pounding effect in the main gear and the gear reducer. If such an effect were left to continue, it would result in damage to the foundations and the kiln parts.

The usual method of driving the main pinion was to mount it directly on the reducer extended low speed shaft held in an outboard bearing.

By utilizing the proper flexible coupling installing it between the reducer low speed shaft and a jackshaft mounting the pinion, we can drop the critical speed below the operating range, nullifying the otherwise detrimental effects of vibration.

The matter of critical speed and its effect on operation should be investigated thoroughly when deciding to increase kiln speed in an attempt to increase kiln capacity.

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports
Rolls, contract, per ton $105.00/116.00
Sheets ..... 118.00/ —

F.o.b. Mills. C.l. Prt. allowed, dock, N. Y.

Kraft— per cwt., 40# base wgt.
Standard Wrapping Rolls ..... $7.75/ —
No. 1 Wrapping Rolls 8.35/ 8.50
Standard Bag ..... 7.50/ —

Tissues— per ream 24x36 (480) 10 lbs. 3000 lbs or more
Wh. No. 1 Frd. ..... $1.95 /$2.25
Wh. No. 1 MG ..... 2.10 / 2.40
Wh. No. 1½ ..... 1.85 / 2.15
Wh. No. 2 ..... 1.85 / 2.15
Kraft Anti-Tar 20x30 ..... 1.85 / 2.15
White Anti-Tar 20x30 ..... 1.95 / —

Toilet— per case of 100 rolls—1 M sheets
Unbleached 4½x4½ ..... $8.00/$8.25
Unbleached 4½x5 ..... 6.60/ —
Bleached 4½x4½ 10.00/12.50
Bleached 4½x5 ..... 9.85/ —
Per Case of 50 rolls—2000 sheets
Unbleached 4½x4½ ..... $8.00/$9.75
Bleached 4½x4½ ..... 6.95/ —
Per Case of 100 rolls—1000 sheets
Facial, 4½x5, 2-ply $8.95/10.65

Paper Towels— per case of 3750
Wh. Jr. M'tif'd 9½x9½ $5.75
Br. Sr. M'tif'd 9½x12 ..... 4.10
Br. Jr. M'tif'd 9½x9½ 3.60
Br. Jr. Sgl. fold 9½x10¼ 3.65
Blchd. 7½x11, 24/25 rolls $7.00/7.35

Manila, per cwt.
No. 1 Jute Tag, 100-lb., sheets* .. $19.55/21.55
Reg. Jute M.F. 40-lb., sheets* .. 18.00/20.00
Wrapping Manila 8.75/10.50
Printing Manila 10.50/12.00
* Less usual allowance for rolls.

Gummed Tape—per bdl., 500 bdls. or more
90-lb. 375 ft. GSI ..... $7.20 / —
60-lb. 600 ft. GSI ..... 7.20 / —
35-lb. 800 ft. GSI ..... 8.28 / —
35-lb. 500 ft. GSO ..... 6.21 / —

MARKET WOOD PULP

Third Quarter Contract Prices, Per Short Air-Dry Ton

	Varying freight allowances		On Dock Atlantic Ports		
	*U. S.	Canadian	*Swedish	*Finnish	*Norwegian
Groundwood	$92.50/ —	‡$95.00/100.00			
Sulfate, Bleached	145.00/ —	190.00/200.00	$230.00/ —	$230.00/ —	$230.00/ —
Semi-bleached Sulfate	140.00/ —				
Sulfate, Unbl.	132.50/ —	145.00/175.00	200.00/ —	200.00/ —	
Sulfite, Blchd.	140.00/ —	160.00/175.00	225.00/ —	225.00/ —	225.00/ —
Sulfite, Unblchd.	132.50/ —	150.00/160.00	200.00/ —	200.00/ —	
Sulfite, Unbl'd (Glassine)		164.00/ —			
Soda, Blchd.	140.00/ —	155.00/160.00			
Sulfite Screenings	72.50/ —				
Sulfate Screenings	57.50/ —				
Groundwood Screenings	60.00/ —				
Unblchd Sulfate Siderums	132.50/ —				
Stand. News. Siderums	92.50/ —	106.00 —			

* OPS Ceiling, CPR 49 ‡ F.o.b. Shipping Point.

Boards, per ton—
Filled News ..... $107.50/ —
Plain Chip 105.00/107.50
Blchd. Mla. L.d. Chip ..... 147.50/ —
White Pat. coated .020 ..... 170.00/ —
Kraft Liners 42 lb. 115.00/117.50
Kraft Corr. .009 ..... 123.50/126.00
Binders Boards 137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Cms.
	per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Cms.
	per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Cms.
	per cwt.
Watermarked	$19.00/$20.50
Plain	18.05/ 19.50

Ledgers	4 Cms.
	per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case
	per cwt.
No. 1	$23.40/$24.00
No. 2	21.90/ 22.40
No. 3	20.40/ 20.80
Machine Coated	
No. 1	$18.15/$18.60
No. 2	16.15/ 16.55
Uncoated	
No. 1 Antique (Watermarked)	$18.65/$19.10
Offset	17.40/ 19.00
A Grade E. F.	17.40/ 18.00
A Grade S. C.	18.15/ 18.60
B Grade E. F.	17.65/ —
B Grade S. C.	16.90/ 18.00

‡ Indicates a price change.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.)

	New York	Philadelphia	Boston	Chicago
	July 9	July 6	July 7	July 5
No. 1 Mixed Paper	$19.00/ 24.00	$21.00/ 24.00	$19.00/ 21.00	$20.00/ —
Boxboard Cuts	20.00/ 25.00	21.00/ 24.00	26.00/ —	25.00/ —
Mill Wrappers	20.00/ 30.00	25.00/ 30.00	22.00/ 30.00	22.00/ —
No. 1 News	23.00/ 25.00	22.00/ 25.00	— /22.00	22.00/ —
Over-issue News	28.00/ 35.00	30.00/ 35.00	22.00/ 24.00	25.00/ —
Corrugated Containers	64.00/ 68.00	58.00/ 63.00	64.50/ 66.00	52.00/ —
New Corrugated Cuts	Nominal	60.00/ 65.00	55.00/ 65.00	62.00/ —
Double Kraft Ld. Corr. Cuts *	115.00/120.00	105.00/120.00	120.00/140.00	120.00/ —
100% Kraft Corr. Cuts *	140.00/165.00	125.00/135.00	130.00/170.00	140.00/ —
Used Kraft Bags *	85.00/105.00	80.00/ 85.00	85.00/116.50	65.00/ —
No. 1 Brown Kraft Paper	70.00/ 75.00	90.00/ 95.00	90.00/110.00	65.00/ —
Super Resorted Br. Kraft *	100.00/105.00	100.00/105.00	100.00/125.00	90.00/ —
New Br. Kraft Env. Cuts *	160.00/180.00	160.00/175.00	160.00/180.00	150.00/ —
New Br. Kraft Cuts *	150.00/175.00	130.00/140.00	150.00/180.00	140.00/ —
No. 1 Gdwd Shvs.	65.00/ 70.00	50.00/ 65.00	75.00/ 85.00	55.00/ —
White Newsblanks	100.00/110.00	80.00/ 90.00	90.00/100.00	80.00/ —
No. 1 Flyleaf Shvs. *	80.00/120.00	80.00/ 85.00	95.00/110.00	100.00/ —
No. 1 Soft Wht. Shvs. *	160.00/190.00	170.00/175.00	175.00/195.00	175.00/ —
Super Soft Wht. Shvs. *	190.00/200.00	190.00/200.00	190.00/210.00	185.00/ —
Hd. Wht. Shvs. *	185.00/210.00	190.00/215.00	190.00/215.00	188.00/ —
Hd. Wht. Env. Cuts *	200.00/245.00	200.00/225.00	200.00/235.00	190.00/ —
New Manila Env. Cuts *	140.00/150.00	160.00/165.00	140.00/165.00	115.00/ —
Col. Tab Cards *	110.00/120.00	115.00/120.00	95.00/150.00	100.00/ —
Manila Tab Cards *	170.00/185.00	165.00/190.00	160.00/200.00	165.00/ —
No. 1 Mixed Ledger *	95.00/105.00	100.00/105.00	87.00/110.00	100.00/ —
White Ledger *	130.00/140.00	125.00/130.00	125.00/140.00	125.00/ —
No. 1 Book & Mag.†	41.00/ 45.00	35.00/ 45.00	40.00/ 60.00	25.00/ —
No. 1 Rep'd. Hvy. Bookst	50.00/ 55.00	50.00/ 65.00	60.00/ 75.00	50.00/ —

* GCPR Ceiling. † Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28
Delivered Mill Basis

Add 7½% Dealer Commission

No. 1 White Shirts	$21.00
No. 1 Unblchd. Muslins	21.00
Blchd. & Unblchd. Underwears	21.00
Blchd. Canton Flannels	21.00
No. 1 Light Silesias	16.00
No. 1 Light Prints	17.00
No. 1 Blue Overalls	14.00
Suntan Khakis	13.00

Add 10% Dealer Commission

Fancy Shirts	$10.00
Indigo Blues	10.00
Mixed Khakis	8.00
Corduroys	8.00
Cottonades	8.00
No. 1 Washables	6.50

Old Domestic Cotton Rags
(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$5.00/$5.50
Cotton Pants & Overalls	4.25/ 5.00
Thirds and Blues, Repacked	3.75/ 4.00
No. 1 Roofing Rags	2.40/ 2.50
No. 2 Roofing Rags	1.90/ 2.00
No. 3 & 4 Roofing Rags	1.80/ 1.90

Bagging
(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$6.00/ 6.50
Domestic Gunny, No. 1	6.00/ 6.50
Heavy Wool Tares	8.00/ 8.25
Foreign Manila Rope	8.50/ 8.75
Domestic Manila Rope	9.00/ 9.25
Jute Strings	6.00/ 6.50
No. 1 Sisal Strings	8.00/ 8.25
Paper Mill Tares	5.25/ 5.75
Foreign Scrap Burlap	5.00/ 5.25
Domestic Scrap Burlap	6.50/ 7.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.50/ 8.00

MATERIALS

Aluminum, sulfate:			
comi. bags, wks.	cwt.	1.65	
iron-free c.l.		3.25	
Alcohol, ethyl:			
tax free, dms. c.l.	gal.	1.01	/ 1.05½
deld. East Miss.			
Alcohol, methyl:			
Synthetic, Zone 1, dms.			
c.l. fit. afld.	gal.	.44	
Casein, acid-prec.:			
dom. sh. pt. c.l.	lb.	.39	/ .41½
imp. ex. dock	lb.	.39	/ .40
Caustic soda:			
c.l. wks. solid, 76%, cwt.		3.35	
flak. & grd. 100-lb. drums		3.75	
liquid 50% tanks		3.55	
liquid 70% tanks		3.65	
China clay:			
dom. air-float. filler, c.l. wks.	ton	10.00	
water-washed, lump, filler		11.00	
coating		17.60	/30.50
imported, ex whse.	short ton	15.20	/28.35
Chlorine:			
single-unit tanks, works	cwt.	2.70	
multi-unit	cwt.	3.25	/ 4.40
Formaldehyde:			
USP, inh. dms, c.l. wks.	lb.	.0625/	.0675
l.c.l., E. wks.		.0675/	.0725
Fuel oil:			
Bunker C, No. 6 Cal. bvy			
tanks, refinery	bbl.	1.95	/ 2.15
light	bbl.	2.00	/ 2.25
Hydrogen peroxide:			
USP, 35% cbys. E. of Miss.			
Lime:	lb.	.23½/	.26½
hydrated, bags, wks.	ton	13.50	
Rosin:			
B gum, drms, c.l. Savan.	cwt.	8.00	/ 9.05*
G, H, I, K	cwt.	8.25	/ 9.40*
FF, wood, dk.	cwt.	7.30	/ —
* OPS Ceiling, CPR 52.			
Rosin size:			
70%, gum & pale grds. tank			
cars, south, sh. pt.	cwt.	6.61	/ 6.75
Salt cake.			
dom. bulk, c.l. wks.	ton	17.00	
wks. frt. all	ton	30.00	/32.00
Soda ash:			
light, 58%, bags, wks.		1.50	
bulk	cwt.	1.39	
Sodium silicate 40°:			
turbid. c.l. wks.	cwt.	1.30	/
l.c.l. wks.		1.60	/ 1.83
Sodium peroxide:			
dms. c.l. E. of Miss.	lb.	.21	
l.c.l. do.	lb.	.21½/	.22
Soybean, protein:			
chem. ind, wks. c.l.	lb.	.24	/ —
Clas. and Chic.			

Sulfuric acid:			
60° Be. cbys. c.l. wks.	cwt.	1.75	/ —
l.c.l. wks.	cwt.	2.05	/ 2.85
Sulfur:			
crude, c.l. mines, contract,	long ton	21.00	/22.00
f.a.b vessels Gulf		22.50	/23.50
Sulfur dioxide:			
liquid, comi. cyl. wks.	lb.	.09	
multi-unit cars	lb.	.0833	
Starches:			
pearl corn, bags, c.l. wks.	cwt.	6.02	/ —
white dextrines, c.l. wks.	cwt.	7.41	/ —
potato, Idaho, c.l. wks.	cwt.	5.80	/ —
potato, Maine, c.l. wks.	cwt.	5.75	/ —
tapioca, conv. dextrines	cwt.	7.75	/ 8.50
low, Siam, on dock N. Y.		5.75	/ 6.00
Talc:		nominal	
domestic, 50-lb. sacks, c.l. wks.	ton	28.00	/30.00
Titanium dioxide:			
anastase, c.l. deld., bags	lb.	.21	/ .21½
l.c.l. deld.	lb.	.22	/ .22½
rutile, c.l. deld.	lb.	.23	/ .23½
l.c.l. deld.	lb.	.24	/ .24½

EUROPEAN SPOTLIGHT

High prices and scarcity—these are the two dominant problems facing the European paper market.

High Prices

About high prices: illustrative may be following small advertisement we found in an Austrian trade journal for timber and foresting: "We buy firewood chips in any quantity—we pay woodpulp—prices."

In the United Kingdom paper prices have risen nearly 30 percent in April of this year, printings quoting now £134 against £106 a ton in the preceding month. Many other papers rose about £30. In England, but also in any other part of Western Europe, further advances are expected. In the month of June, we could notice a further slight increase, but it seems to those most interested in the paper market that producers do not expect that prices will increase considerably and even rumours are running about a sharp fall in prices to come next year.

High prices of newsprint are the daily topic for all newspapers and sure it is true that in some countries, among which Denmark, newspapers cannot afford to pay such high prices and some papers have already disappeared. In England, Belgium and Denmark, prices for newspapers had to go up to follow the advance in newsprint, and England had to leave its old tradition of the one-penny-paper. In Belgium a real war amongst publishers of papers broke out, some of them quoting enhanced prices, others trying to find their living by low prices and large circulation. Especially in Denmark, newspapers are a little angry with their Scandinavian suppliers.

Scarcity is Relative

Scarcity is rather relative as production and consumption in most of the European countries has tendency to rise considerably. In Western Germany lack of fuel is a bottleneck but nevertheless production of all sorts of paper has risen to about 140,000 metric tons a month. However, sulphate papers and newsprint do not share in this growth. German consumption rose from 10 kg per capita after the war, till 32 kg now. Before World War II, consumption was about 50 kg per capita. This rapid growth has been made possible by ERP-help, for import of paper, converted paper and papermaking materials in Western Germany exceeds by DM 74.6 millions the German export of these articles. Before the war, Germany could boast an export exceeding by 90 million RM the import of paper and papermaking materials. This great difference between import and export will make it impossible for Germany to come back again on the level of pre-war consumption. In Austria, however, export exceeds slightly the import, and consumption rose from 17 kg before the war to 24 kg now. Existing planning to enhance production provides for an export of ¾ and enhancing consumption to 35 kg.

European statistics generally do not give figures for stocks. It is assumed that stocks are rather large, except for newsprint and sulphate papers. Scarcity of paper in Europe can be expressed in the figure of about 200,-

WILLIAMS PRECISION FREENESS TESTER

The Most Accurate Freeness Tester Ever Built

Operates on the Only Correct Principle of Freeness Testing.
Automatic Timing with Electric Stop Clock which Measures Drainage Rate through a Wire, same as on Paper Machine.

For 25 years we have developed and manufactured Pulp and Paper Testing Equipment

Pulp Testing Ovens
Sheet Moulds
Laboratory Presses
Sheet Dryers
Wood Chip Classifiers
Pebble Mills

A.S.T.M. Penetration Testers
Electric Centrifuges
Paper Moisture Testers
Smoothness Testers
Laminating and Plastic Moulding Presses

WILLIAMS APPARATUS CO., Inc.

19 Park Place — Watertown, N. Y.

000 metric tons of paper and woodpulp, which quantity will be sufficient to fill the gap. It is thought that a 4-shift system in paper—and woodpulp mills may contribute considerably in filling the gap and it may be possible that in Scandinavian countries the 4-shift system—be it against higher wages—will be introduced.

Newsprint Scarcity

At the London Congress of Directors of European newspapers, the French delegation, together with the Netherlands, Belgium, Italy and Sweden proposed an international committee regulating distribution of newsprint. The French want a diminishment of 5 percent in American consumption of newsprint, which will suffice to fill European needs. Prof. Börje Steenberg of the Stockholm Technical High School thinks scarcity of newsprint may be explained by the great risks in establishing new mills. He thinks the next ten years will not show a considerable growth in capacity.

New Raw Materials

Most remarkable in Western Europe is the growing interest in new raw materials. The French are doing much work with tropical hardwoods. In England, straw is getting more attention, esparto being a rather dear raw material. In Germany rumors about trials with all kinds of materials are always running. Straw is a very important factor now in most west European countries. Especially in Holland we find, apart from a very important strawboard industry, a well-equipped straw pulp industry, which fills a considerable hole in the dutch raw material position. The new Aku-mill, which will make straw pulp both for rayon and for paper, will contribute considerably to a more sane position. The present output of the two mills working is about 15,000 tons. Both mills will enlarge their production and in 1952, with the Aku-mill joining the two, production of straw pulp is expected to reach the height of about 50,000 tons annually.

For tropical woods, a international congress will be held in Paris end of September next. France has in Africa large resources of wood and it will be of great importance for European paper-market if in a near future paper can be made on an economical scale from tropical hardwoods. Trial papers made from this wood were shown to us some weeks ago and the results seemed very encouraging.

Use of Waste Paper Grows

Waste paper is also getting much interest. In most European countries, the share of waste paper among the raw materials has grown considerably; however its share is not yet equal to American conditions. Exports of waste paper from Norway diminished greatly this year, and the same applies to many other countries. Each country now badly needs its own materials and the Irish Republic even prohibited by law in March 1951 any export of waste paper. Export permits will be given only in very particular cases. Most countries cannot find enough waste paper, so England will need this year in total at least one million metric tons, but in 1950 only 847,000 tons were assembled.

FINANCIAL

Abitibi Power & Paper Co., Ltd., reports that necessary financing in connection with the acquisition of 50 percent of the shares of Alaska Pine & Cellulose Ltd., has been successfully completed and as a result the secured bank loan of $17,139,000 appearing on the books of Abitibi at December 31 has been repaid in full.

Donnacona Paper Co., Ltd., has declared a dividend of 50 cents, payable October 1 to stock holders of record August 31.

Pacific Mills Ltd., of Vancouver, B. C., a subsidiary of the U. S. Crown Zellerbach Corp., reports a net profit of $4,238,433 for fiscal year ended April 30 or equal to $13.73 per share, as against $3,365,307 or $10.82 per share in the preceding year. Sales in-

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CORES
CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted

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BLEACHED SULPHITE
PULP
•
for the manufacture of Cellophane, Rayon and Products of Paper

Restigouche
BLEACHED SULPHITE PULP

RESTIGOUCHE COMPANY, LTD.
Campbellton, N. B., Canada

creased 25 percent to $27,668,877. Total tonnage output was the highest in the firm's history, 162,922 tons, a gain of 19 percent over 1949-50, and of the total, 8,463 tons was newsprint or about the same level as the previous year.

Bathurst Power & Paper Co., Ltd., has declared a dividend of 75c on Class A stock, payable September 1 to stockholders of record August 3.

Atlanta Paper Co. has declared a cash dividend of 10 cents per share on the outstanding common stock of the company, payable July 15 to stockholders of record June 30.

Minnesota & Ontario Paper Co. have declared a common stock dividend of 50 cents a share, payable July 25 to holders of record June 29.

Profits Down, Sales Up For First Quarter

Profits of U. S. manufacturing corporations were down although sales reached an all-time peak in the first quarter of 1951, according to the quarterly estimates made public jointly today by the Federal Trade Commission and the Securities and Exchange Commission.

Net profits after taxes in the first quarter amounted to $3.3 billion, an 8 percent decline from fourth quarter 1950 profits. These profits, however, were bettered only in the last two quarters of 1950 and were 36 percent above the first quarter of 1950.

The decline in profits in the first quarter of 1951 occurred in the face of the rise of net sales of manufacturing corporations to a new record of $53.1 billion. Costs and expenses increased somewhat more than sales and, as a result, net operating profit declined about 1 percent. The relatively larger decline in profits after taxes reflected lower non-operating income in the first quarter of 1951.

Some summary figures on the financial performance of manufacturing corporations are given below:

ALL MANUFACTURING CORPORATIONS
(Dollar amounts in billions)

	1st Q. 1951	4th Q. 1950	1st Q. 1950
Sales	$53.1	$51.2	$38.5
Costs and expenses	46.0	44.0	34.7
Net operating profit	7.1	7.2	3.9
Net income before Federal income taxes	7.2	7.6	3.9
Provision for Federal income taxes	3.9	4.1	1.5
Net income after Fedreal income taxes	3.3	3.5	2.4
Dividends	1.2	2.3	1.0
Profits after taxes per dollar of sales	6.1c	6.9c	6.2c
Annual rate of profit after taxes on stockholders' equity	14.8%	16.4%	12.0%

A comparison of profits in the first quarter of 1951 with those in the fourth quarter of 1950, by industries, is shown in the following table:

PROFITS OF MANUFACTURING CORPORATIONS BY INDUSTRY GROUPS
(Amounts in millions of dollars)

	Profits before Taxes			Profits after Taxes		
Industry Group	4th Q. 1950	1st Q. 1951	Percent Change	4th Q. 1950	1st Q. 1951	Percent Change
Food	$522	$461	—12	$251	$220	—12
Tobacco	81	68	—16	36	32	—11
Textile mill products	368	376	+ 2	184	181	— 2
Apparel and finished textiles	66	64	— 3	34	33	— 3
Lumber and wood products	152	154	+ 1	81	79	— 2
Furniture and fixtures	69	64	— 7	36	30	—17
Paper and allied products	361	411	+14	186	172	— 8
Printing and publishing	65	77	+18	32	36	+12
Chemicals	790	836	+ 6	343	352	+ 3
Petroleum and coal	895	799	—11	611	496	—19
Rubber	176	167	— 5	79	73	— 8
Leather	52	42	—19	28	20	—29
Stone, clay and glass	277	261	— 6	113	113	....
Primary non-ferrous metal	313	281	—10	165	139	—16
Primary iron and steel	663	652	— 2	257	253	— 2
Fabricated metal	366	377	+ 3	171	174	+ 2
Machinery (excl. elec. and transp.)	619	666	+ 8	288	291	+ 1
Electrical machinery	529	418	—21	215	164	—24
Transportation equipment (excl. autos)	132	89	—33	61	42	—31
Motor vehicles and parts	889	716	—19	255	265	+ 4
Instruments, etc.	131	103	—21	59	44	—25
Miscellaneous	108	112	+ 4	55	53	— 4
All manufacturing	7626	7194	— 6	3541	3261	— 8

NEW LITERATURE

American Standards Ass'n., Inc. Booklet, "The Strange Case of the Seven-Sided Post Hole." Conveys certain basic ideas about industrial, consumer and safety standards.

Bauer Bros. Co. Bulletin, No. 52, "Bauer Machinery for the Process Industries." Illustrates and describes the diversified line of attrition mills, pulp refiners, beaters, classifiers, and other processing machinery.

Association of Better Business Bureaus, Inc. Booklet, "The Public Interest." A report for 1950.

The Carpenter Steel Co. Set of data sheets. "How You Can Get More Stainless Steel Pipe For Your Money."

Daystrom, Inc. Booklet, "National Defense Program Manpower Policies of Daystrom, Inc." Discusses fair wages, working conditions, advancement, training, plant security, and veterans' reemployment privileges.

W. C. Dillon & Co., Inc. Bulletin, "Mechanical Pressure Gauge." Technical data with specifications.

E. I. Du Pont De Nemours & Co. Booklet, "This is Du Pont—The Story of Research."

Field Research Div. Paper Cup and Container Inst., Inc. Booklet, "Single News." Features paper service in disaster-feeding, assembly line pickup, hospital service, U. S. O., etc.

F. T. Griswold Mfg. Co. Bulletin, "Griswold OPL Metallograph." Sales and technical copy with typical microphotographs made by the instrument of hypereutectoid steel samples at magnifications of x400, x1200 and x3400.

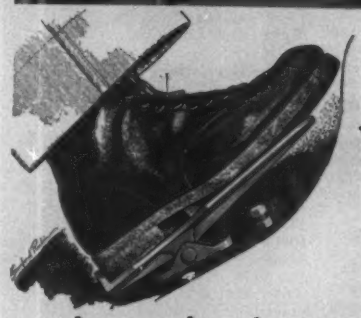
Minneapolis - Honeywell Regulator Co. Specification Sheet No. 417-1, "Displacement Type Liquid Level Transmitter." Gives pertinent data such as ranges, materials, connections, and dimensions. Construction and operating principle are also illustrated and discussed. Also, Instrumentation Data Sheet 10.5-4, "Humidities For Industrial Air Conditioning Recorded and Controlled Electronically—Rapidly—Directly."

Ingersoll-Rand Bulletin, "The toughest Jobs Made Easy With the New Size 34U Electric Impactool. Sales copy.

Electric Steel Foundry Co. Catalog, "ESCO Stainless and High Alloy Products for the Process Industries, No. 175." An enlarged edition of original process equipment catalog. Features special equipment for the pulp and paper and other processing industries.

Electric Machinery Mfg. Co. Booklet, "E-M Synchronizer No. 33." Deals with large pumps and the application of a-c motors to them.

National Lime Ass'n. Books, "Water Supply and Treatment." New 7th Edition, 211 pp., $1.25 per copy, plus postage of 12c. Contains a number of im-



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portant revisions covering disposal and reclamation of lime sludge, versenate method of determining water hardness, polystyrene base exchange, methods of recarbonating softened water. Includes 99 illustrations some of which are in multi-color form.

Naylor Pipe Co. Bulletin, "Heavy-Duty Wedge-Lock Coupling." Sales & Tech. copy with Specs.

International Nickel Co., Inc. Booklet, "Practical Solutions to Metal Problems in Pulp and Paper Mills." Traces a typical mill operation and points out some common trouble spots. Also tells how nickel and nickel alloys have been used to minimize slime, corrosion, and other deteriorating factors, and presents some case histories. Illustrated. Available gratis.

H. Th. Refsum Booklet, "Speed Up Your Production." Features improvements on the Roen Automatic Reeling Machine for the papermaking industries.

Remington Rand Inc. Booklet X-1203, "Record Research Report on CMP." Outlines methods for simplifying paperwork on Controlled Materials Plan.

Poirier Control Co. Bulletin 012, "Poirier Master Syphon System." Technical copy with layout for pulp stock and vacuum controlling equipment. Also bulletin illustrating the Poirier Syphon System For Economy. Sales copy.

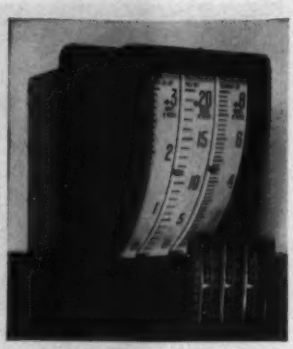
U. S. Dept. of Commerce Booklet, "Eighty Questions and Answers on the Controlled Materials Plan." Designed to answer the questions most frequently asked at CMP educational conferences recently held for business men in 20 key cities. Free copies are obtainable from NPA at Washington, and from Commerce Department, and will shortly be available at Commerce Department Field Offices.

Reynolds Metals Co. Book, "Reynolds Aluminum and the Co. That Makes It." 48-pp. 250 illustrations. An insert contains full color reproductions on foil of nationally known consumer goods packaged in aluminum. Copies available gratis.

NEW EQUIPMENT

Miniature Instruments

Offered under the trade name MINI-LINE, the miniature indicators and control units concentrate into a small space before a single operator all information and controls for operating one or more boilers, turbines or process units such as pulp and paper mills, chemical plants, etc. Space savings announced are considerable: Multi-Point Indicator uses 87 percent less space than its standard size counterpart. A three-unit instrument is 4¼" wide and 4¾" high. Selector Valve—size 4½" x 6¼"—can be used for either remote manual or automatic operation of air-



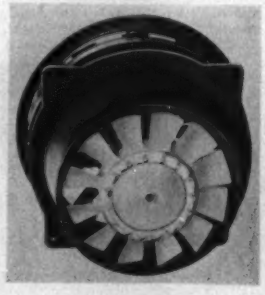
operated controls. Uses 52 percent less space. Remote Manual Relay, for factors which do not warrant automatic control but which need only occasional manual adjustment, measures 2⅜" x 6¼" with space saving of 70 percent. Cut shows a standard size Multi-Pointer Gage behind a MINI-LINE Multi-Point Indicator.

Syncro-Fly Cutter

The Jagenberg Syncro-fly Cutter is designed to square-cut boxboard, sheet pulp and corrugated container board up to 150 to 190 points thickness at speeds to 600 f.p.m. and to 300 cuts per minute. The machine, which gives a shear cut between two reversely rotating fly knives, synchronizes the speed of its two small-diameter cutting drums with that of the oncoming paper web. Drums on which knives are mounted are set at a fixed angle to traveling direction so that angular deviation is compensated and a rectangular cut results independent of sheet size. Other design features include quiet operation, a minimum of knife-wear, and hand-wheel setting for any desired sheet size. Web is not bent before, during or after cutting, the manufacturer states.

Industrial Oil Burner

The new burner utilizes steam under pressure to atomize oil into the smallest possible particles. Designated FAN-MIX, it is so designed that the fan's power requirement coincides with the power developed from the reaction force of the steam atomized oil. If the amount of fuel is increased, the

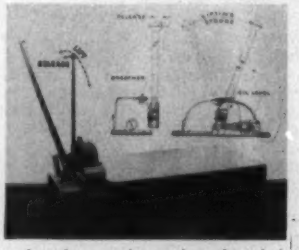


speed of the fan increases, thus automatically maintaining the proper fuel-air ratio.

The atomized particles are discharged through rapidly rotating orifices and thrown outward into a cylindrical "sleeve" of air. This air-fuel mixture is then projected into the furnace by a fan, which is rotated by the jet reaction of the steam-atomized oil. Violent mechanical mixing of the atomized oil and air brings the oxygen molecules together with the hydrocarbon molecules of the fuel, resulting in rapid and complete combustion and consequently a very short flame pattern. Advantages claimed for the new design are: increased boiler ratings, improved fuel efficiency, elimination of hot spots, no forced draft equipment required, stack requirements cut, coking of atomizers reduced.

Lightning Load-Lift

The new Marforge load-lift features a labor-saving pump. Developed to cut working time, the unique aluminum single-unit oil tank and pump combination enables the unit to raise loads 25 percent easier and 25 percent faster, it is said. Hydraulic fluid is contained in the unit above the dual pumps, a construction which allows the fluid to



circulate by gravity rather than being sucked up into the pump from a separate tank underneath. *Aeronautic* design and machine tolerances also are employed to increase efficiency.

Truck is lowered or lifted by a simple right-angle flick of the handle, an innovation which eliminates stooping or bending to lower the loads. Mechanism is separate from pulling handle. The one-unit pump also eliminates the need for gaskets, dust boot and needle-type valve, it fits interchangeably into all standard Load-Lifts and may be purchased as a separate unit.

Syphon System Improved

A clear glass observation plate has been embodied in the Poirier Syphon System which permits the water to be observed as the vacuum is created. Also announced is an important new feature in stock controlling. An automatic control of the level in the overflow chamber is designed to keep the level of the stock at a given point, thus eliminating fluctuations due to stock pump and its conduit, the stock chest level, and consistency changes.

Continuous Sampling Monitor

The continuous sampling monitor is an electrical device which automatically keeps track of the sampling procedure.

Designed to eliminate the complexity of paperwork inherent in the continuous sampling methods of quality control, it automatically keeps a record and informs whether sampling is 100 percent sorting as required.

The monitor is contained in a small cabinet approximately 12" x 6" x 6". The control box, located so that the inspector can easily operate the push-buttons and read the indicator lights, is 4" x 4" x 2" and is connected to the monitor by a multiconductor cable. An electric counter, set to any predetermined number from 1 to 400, automatically keeps track of the clearance number. When the counter reaches the set number, contact is broken, and the white sampling light goes on indicating that the predetermined number of acceptable units has been inspected, and that sampling can resume. Percentage inspection or sampling may vary from 1 per cent to 50 per cent depending on the desired AOQL.

SUPPLIERS

WATERVILLE IRON WORKS, Waterville, Maine, has been acquired by local men, with Louis Wolman as president. The new owners will continue manufacturing wood room machinery and add improved types shortly.

HERCULES POWDER CO. has assigned Eugene S. Massey technical sales representative in Cleveland for the Synthetics Department. He will assist W. W. Trowell, manager of Synthetics' Cleveland office.

NATIONAL ANILINE DIVISION, Allied Chemical & Dye Corp'n., warehouse previously located at 357 West Erie street, Chicago, has been moved to larger quarters in a thoroughly modernized warehouse at 3355 West 48th Place, in Central Manufacturing Kedize Development which is served by the Chicago Junction Railway.

REICHHOLD CHEMICALS, INC., has selected Charlotte, N. C., as the site of a "Central Atlantic" manufacturing division.

Construction work on the Charlotte plant has already been started on a seven acre tract about two and a quarter miles south of the center of the city. Manufacturing, warehousing and laboratory facilities will be included and present plans call for two half-million dollar units, each with some 32,000 square feet of floor space, the second unit to be built next year. Approximately 100 workers will be required to man the initial unit, with another 100 to 150 slated for employment when the entire project is finished.

CAMERON MACHINE CO., Brooklyn, N. Y., has appointed Harry Armstrong, Sr., assistant secretary. Mr. Armstrong has been associated with Cameron for twenty-two years.

F. C. HUYCK & SONS, Rensselaer, N. Y., have accepted with regret the resignation of Dr. Edwin A. Rees as director of felt sales and a member of the Board of Directors of the company. Although Dr. Rees wanted to be relieved of executive responsibilities, his associates are pleased that he has agreed to continue with the company as consultant on papermakers' felt problems.

WHITING CORP., Harvey, Ill., has elected Stevens H. Hammond chair-

Left: Horizontal feed section receives wood chips from storage silos and elevates to adjacent building and digesters. S-A Circular Bin Dischargers under each silo, feed chips into the REDLER.

Handle WOOD CHIPS

Easier

Faster

At Lower Cost

with

REDLER

"Continuous-Flow"

Conveyor-Elevators

Wood chips move in a compact stream through the casing of a REDLER which conveys and elevates horizontally, vertically, up inclines and around bend corners. REDLERS often combine the functions of a feeder, a conveyor and an elevator . . . in a single handling unit.

REDLER conveying action consists of skeleton flights linked together and moving through the totally enclosed casings to induce the gentle mass movement of material in any direction. Comparatively small cross section of REDLER casing means that less space is required and casings can be installed without major alterations to existing structures.

REDLERS are the modern, low-cost way to handle wood chips. Write for Catalog 140 which gives complete information . . . no obligation.

Cross-section of standard REDLER casing. This shows material moving with carrying flights in lower run and empty flights returning in circuit fashion in the upper run.

1901-1951

50 years experience with bulk handling

STEPHEN S-A ADAMSON MFG. CO.

42 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. · Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

man of the board. J. A. Handley will continue as vice-president and chief executive officer.

Mr. Handley reported that new orders are continuing at a high level, bringing backlog above $20 million, an all-time high. Higher shipments and profits during the latter part of the fiscal year ended April 30, 1951, enabled the company to overcome losses in the earlier months of the year. He predicted the year-end audit would show net profits somewhat above the preceding year. The board also declared a cash dividend of 10 cents per share, payable July 16, to stock of record at the close of business on July 2, 1951.

WOLVERINE PAPER CONVERTING MACHINERY CORP. and associate company, Nasko Machinery Corp., have acquired new property at 3545 Seven Mile Road East, Detroit 34, Mich. This expansion program was necessitated by increased business.

ROOTS-CONNERSVILLE BLOWER CORP. reports an investment of a million and a half dollars in a construction program covering new erection floor, expansion of present test facilities, manufacturing space, and machine tools.

These new facilities will enable Roots-Connersville to test the largest centrifugal blowers and compressors ever designed, which it is now building.

ARTHUR D. LITTLE, INC., industrial research and engineering firm of Cambridge, Mass., has added to its staff John Fletcher, specialist in the field of varnishes, synthetic resins and protective coatings.

Mr. Fletcher was associated with Rohm & Haas Co. and Glidden Co. Most recently he operated his own laboratory, the Elmwood Research Laboratories, in North Attleboro, Mass.

WORTHINGTON PUMP AND MACHINERY CORP. moved its sales and engineering functions of the Water Treating Section from the company's Dunellen, N. J., plant to its Harrison, N. J., plant. The engineering function will continue under the charge of J. F. Sebald and the sales function under A. L. Jones.

NORTH AMERICAN CYANAMID, INC., is expanding facilities for the production of basic chemicals at plants in Niagara Falls and Welland, Ont. A further step in the expansion program will be the installation of equipment which will increase American Cyanamid Company's capacity for the production of melamine at Willow Island, West Va.

BRIDGEPORT BRASS CO. appointed L. E. Menns as their Pacific Coast sales manager. Mr. Menns, who has been serving as Los Angeles district manager for Bridgeport, will be in charge of their San Francisco district office and warehouse as well, and will be responsible for the sale of all Bridgeport products on the Pacific Coast.

PITTSBURGH PLATE GLASS CO. has construction underway on an $8,500,000 expansion of chlorine and caustic soda producing facilities at the Natrium, W. Va., plant operated by Southern Alkali Corp., a wholly-owned subsidiary. The building program will include a new cell building for the production of chlorine and an addition to the caustic soda department.

Originally granted a certificate of necessity by the Defense Production Administration covering 50 per cent of an estimated $10,200,000 for the plant addition, President Harry B. Higgins announced that anticipated expenditures have been pared to $8,500,000 or less.

In an effort to get the new plant into production of the vitally needed chlorine at the earliest possible date, officials of the firm have discarded part of their original plans which included installation of a turbo-generator for additional power supply. Power for the new plant will be purchased from a local public utility when the facility commences production in about 18 to 20 months.

Contracts for the new plant have been let to McCloskey Co. of Pittsburgh for construction of the new cell building and to Sargent and Lundy of Chicago on the boiler installation.

GENERAL ELECTRIC CO. has appointed Douglas J. Donohue Atlantic district sales manager for Trumbull Electric Department, Plainville, Conn. He will maintain his office in Philadelphia.

Mr. Donohue joined Trumbull in 1930 in the company's Pacific Northwest Region. He became head of that region's engineering activities in 1940, and since 1945 has been a salesman for its Eastern territory. He assumed his new duties on July 1.

ROSS INDUSTRIES CORP., Highland Park, N. J., has been merged with its wholly owned subsidiary, J. O. Ross Engineering Corp. Both businesses will henceforth operate under the name of J. O. ROSS ENGINEERING CORP., with main offices at 444 Madison Avenue, New York. There will be no changes in personnel, plants or operation of either organization involved in the transaction.

HARDINGE CO., INC., announces that Lionel E. Booth will direct the activities of its Salt Lake City office, now being re-established. Independently of his work for Hardinge, Mr. Booth will continue his former engineering activities and the sale of the Booth flotation machine. Mr. Booth's offices are at 146 South West Temple Street, Salt Lake City 1, Utah. This address will now also be designated as a Hardinge district office.

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For All Paper Needs
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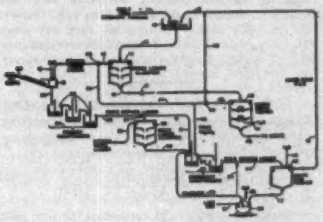
STAINLESS STEEL CASTINGS
FOR ALL EQUIPMENT EXPOSED TO
CORROSION BY SULPHITE ACIDS
OR OTHER CORROSIVE AGENTS
MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN

Patent Abstracts

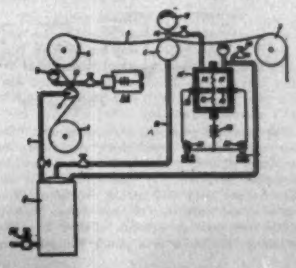
● *In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.*

U.S. 2,552,183 — Two-Stage Causticizing. Cyril H. Knight, Toronto, Ontario, Canada, assignor to The Dorr Company, New York, N. Y. Filed September 19, 1945—Issued May 8, 1951.



In the continuous re-causticizing of green liquor derived from a smelt dissolving station clarifying such green liquor to remove dregs therefrom, decanting weak green liquor from which such dregs have been washed, primarily causticizing such clarified green liquor with an excess of lime to yield a white mother liquor containing NaOH and a precipitate, decanting strong white clarified liquor therefrom and discharging thickened precipitate containing a minor fraction of $Ca(OH)_2$, secondarily causticizing such thickened precipitate with such decanted weak green liquor containing $NaCO_3$ in excess of the $Ca(OH)_2$ of the precipitate to yield a mixed white and green mother liquor, decanting therefrom a clarified weak mixed white and green liquor from which its white mud precipitate has been washed, recycling such decanted weak mixed white and green liquor to the smelt dissolving station, filtering such white mud precipitate, and recycling filtrate therefrom to the secondary causticizing step, said decanted strong white liquor is discharged as the end product strongly causticized liquor and of a sodium hydroxide concentration equivalent to that in the primary causticizing step since all excess lime issuing from the primary causticizing step is absorbed by weak green liquor in the secondary causticizing step and carried back through the system to the smelt dissolving station, whereby such liquor is partly converted to sodium hydroxide before re-reaching the primary causticizing step where its excess and entrained lime aids in the liming operation.

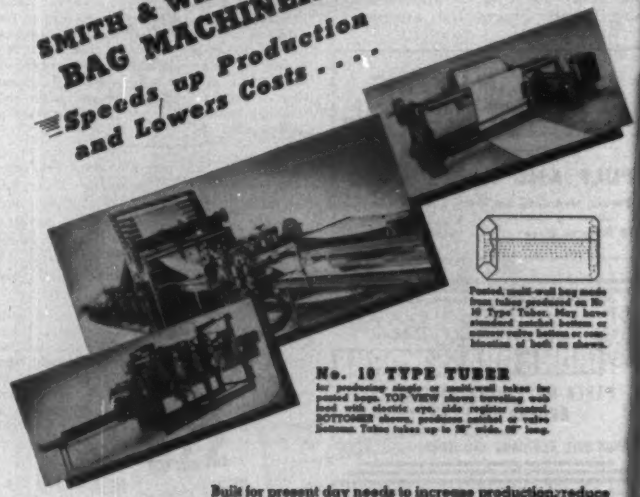
U.S. 2,552,189—Paper Weight Indicating Equipment. Hans P. Kuehni, Schenectady, N. Y., assignor to General Electric Company. Filed April 27, 1946—Issued May 8, 1951.



Apparatus for measuring the tension of flexible sheet material comprising a pair of rollers having spaced apart parallel axes between which the sheet material is stretched, a pressure chamber having a surface parallel to the axes of said rollers adapted to be pressed against one side of the sheet material between the rollers such as to force the sheet material out of line between the rollers so as to form an appreciable angle in the sheet material at such surface, said chamber having a plurality of orifices in its surface facing said sheet material such that the sheet material tends to maintain said orifices closed by tension force component, means for forcing air into said chamber at above atmospheric pressure such that air escapes through the orifices and pushes the sheet material therefrom in opposition to the tension force component of such sheet material thereby causing a reduction of air pressure in said chamber, and means responsive to changes in air pressure in said chamber due to such escape of air calibrated in relation to the tension of such sheet material.

U.S. 2,552190 — Method for Activating Cellulose to Prepare it for Esterification. James C. Lackey, Chattanooga, and Henry G. Reed, Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N. Y. Filed February 17, 1948—Issued May 8, 1951.

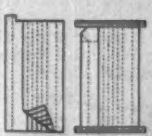
SMITH & WINCHESTER
BAG MACHINERY
Speeds up Production
and Lowers Costs . . . .



Pasted, multi-wall bag made from tubes produced on No. 10 Type Tuber. May have standard sewhot bottom or sewless valve bottom or combination of both as shown.

No. 10 TYPE TUBER
for producing single or multi-wall tubes for pasted bags. TOP VIEW shows traveling web feed with electric eye, side register control. BOTTOMER shows, producing pasted or valve bottom. Tubes tubes up to 32" wide, 60" long.

Built for present day needs to increase production, reduce spoilage and lower unit costs. These machines are custom-made to your requirements and will give continuous, trouble-free service. Increase your profits by speeding up production with Smith & Winchester equipment.



Multi-wall, sewed valve type, gusseted tube made on Smith & Winchester Multi-wall Tuber.

S & W MULTI-WALL TUBER

Up to 100,000 valve notch tubes each 8-hour day may be produced on this Multi-wall Tuber for sewed valve bags. One to 6 walls. Machine built in 2 sizes, 20" and 25" face. Up to 6" gussets. Tubes 25" to 50" long. Improved cross cutting units, photo-electric compensating drives and flying splice paper roll stands can be furnished. If you have a bag problem write us.

THE SMITH & WINCHESTER
Manufacturing Company
South Windham, Conn.

In a process for the manufacture of cellulose esters from dry woodpulp sheet in which the cellulose is activated and then esterified with a lower fatty acid anhydride and an acylation catalyst the activation method which comprises applying to the dry woodpulp sheet, water containing dissolved therein .5-4% of alkali, and an amount of hypochlorite sufficient to supply .1-1% of available chlorine, at a temperature of 150-250° F. for a time within the range of 2-15 minutes sufficient to activate the cellulose, removing the alkali and hypochlorite from the cellulose sheet by spraying on one side thereof with water and subjecting to suction on the other side whereby the water is drawn through the sheet, and then spraying the sheet with a fatty acid of 2-4 carbon atoms and subjecting to suction on the opposite side whereby the water in the sheet is displaced and the fatty acid is introduced therein, the proportion of liquid in the cellulose throughout the activating operation being maintained at at least 15% based on the weight of the cellulose and without further liquid treatment, introducing the so-activated cellulose directly into the esterifying liquid.

U.S. 2,552,474—Conical Paper Dish and Blank Therefor. Walter E. Amberg, Beverly Shores, Ind., assignor to Lily-Tulip Cup Corporation. Filed October 29, 1947—Issued May 8, 1951.

A blank for a conical paper dish having two diametrically opposed and equal curved convex edges having the same radius and center, and two diametrically opposed and equal parallel straight edges forming chords of a circle of the same radius as the convex curved edges generated from the same center, said blank having two crease lines extending inwardly from the straight edges and intersecting at said center.

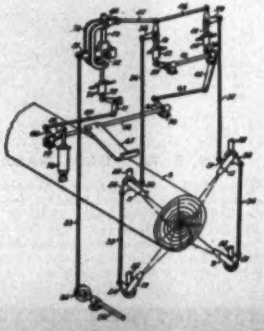
U.S. 2,552,597—Process of Making a Molded Article From Lignocellulose. Warren R. Smith, Crown Point, and Edmund R. Mellenger, Douglaston, N. Y., and Donald F. Othmer, Coudersport, Pa., assignors, by direct and mesne assignments, to Donald F. Othmer, William R. White, Jr., and Louis Ricciardi. Filed July 9, 1947—Issued May 15, 1951.

The process for making a hard, strong, water resistant substantially dry product from lignocellulosic particles or fibers and added lignin, comprising mixing therewith powdered sulfur from about 3 per cent to about 6 per cent of the weight of the lignocellulose and then subjecting the said mixture to a pressure of about 720 to 780 pounds per square inch and at a temperature of about 225° C. to about 250° C., whereby chemical bonding is effected between the said sulfur and the said lignocellulosic material to produce a uniform solid.

U.S. 2,552,612—Continuous Impregnation of Formed Fibrous Material. Douglas D. Adams, Karl Rollius, and John D. Risher, Canton, Ohio, assignors, by mesne assignments, of 76.89 per cent to R. E. MacKenzie and 23.11 per cent to L. V. Bockius. Filed July 18, 1946—Issued May 15, 1951.

The method of continuously impregnating laminated corrugated paper channels having transversely extending corrugations forming tubular passages opening at the ends of the channel legs, comprising the steps of holding said channels to maintain their shape, continuously moving said channels in legs-up position into and through a heated impregnating bath, and inverting said held channels as they pass out of said bath.

U.S. 2,552,871 — Log Barking Apparatus Having Converging Oscillatable Water Jets and Means to Proportionally Vary Center of Convergence and Amplitude of Oscillation. Ernest C. Shaw, Milwaukee, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Filed November 18, 1948—Issued May 15, 1951.

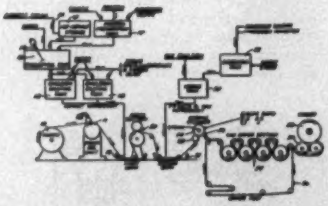


In a device for impinging jets of fluid against the peripheral surfaces of logs, timbers or the like, the combination comprising a conveyer having a substantially horizontal trough-forming element, fixed supports flanking a portion of said trough-forming element and having a plurality of fixed portions substantially equiangularly spaced about the mean path of objects moving longitudinally on said trough-forming element, a corresponding plurality of nozzles operably connected with said support portions for oscillation in planes substantially perpendicular to said mean path, nozzle oscillating means connected with said nozzles and operable to simultaneously oscillate said nozzles through substantially equal angles, and control means having a conveyed object diameter sensitive element operably connected with said nozzle oscillating means and responsive to changes in conveyed object diameter to vary the mean directions and angles of oscillation of said nozzles in proportion to the diameter changes sensed.

U.S. 2,552,947 — Coated Roofing. George Arthur Fasold, Mount Healthy, and Harold W. Greider, Wyoming, Ohio, assignors to The Philip Carey Manufacturing Company. Filed August 7, 1943—Issued May 15, 1951.

A roofing having high resistance to fire, comprising sheet-like base material and carried by said sheet-like base material a layer of thermoplastic bituminous composition, said bituminous composition containing waterproofing bitumen having a softening point above 80° F. and not above 275° F. and of the range 20% to 65% by weight of said composition, and said composition containing intimately commingled and distributed uniformly throughout finely-divided solid water-insoluble filler of the range 35% to 80% by weight of said composition and having a softening point above 500° F., said filler consisting of a mixture of organic filler and heat-resistant mineral filler, and said filler having a flow resistance coefficient of at least 75 when said composition carried by said sheet-like base material is exposed to flame temperature under the flow resistance test defined herein, said heat-resistant mineral filler without said organic filler having a flow resistance coefficient less than 75, said bituminous composition having a Wagner-Bowen plasticity value at 400° F. not substantially greater than 1500 grams, and said bituminous composition providing a pliable weather resistant layer of the hot-spread coating type integrally bonded with said sheet-like base material.

U.S. 2,553,154—Method of Waterproofing and Flameproofing Paper. Edward Hugo Voigtman and John Calvin Bletzinger, Neenah, Wis., assignors to Paper Patents Company, Neenah, Wis., a corporation of Wisconsin. Filed October 3, 1945—Issued May 15, 1951.



The improved process of manufacturing a water and flame resistant paper sheet which comprises the steps of first applying an aqueous emulsion of asphalt to a sheet of paper, then while said sheet is wet with said asphalt emulsion, applying a second emulsion, the continuous phase of which comprises an aqueous solution of a fire inhibiting salt which is a strong electrolyte and

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the discontinuous phase of which comprises a water resistant wax, and finally drying the sheet.

U.S. 2,553,157—Paperboard Animal Trap. Robert B. Worfford, Cincinnati, Ohio, assignor to The Gardner Board and Carton Co., a corporation of Ohio. Filed December 12, 1947—Issued May 15, 1951.

A knock-down tubular carton having body walls in articulation, closure means articulated to the ends of the body walls, one of said closure means being a swingable flap articulated to one of the body walls and of general dimensions slightly less than the end of the carton so as to swing freely within the carton, closure means articulated to adjacent body walls comprising intermediate flaps having opposed portions cut therefrom, said portions forming an aperture when joined, and a body wall opposite said first mentioned body wall having closure means in the form of an outer flap of general dimensions to cover the end of the carton with an entrance hole therein substantially conforming in configuration to the aperture formed by the intermediate flaps, said swingable flap having an intermediate transverse slit adjacent the line of articulation with the corresponding body wall, and score lines connecting the ends of the slit and the side edges of the last mentioned flap, whereby the desired degree of resiliency of said flap may be obtained by varying the length of the slit.

U.S. 2,553,412—Molding Fiber Composition. Clark C. Heritage, Cloquet, Minn., assignor to Wood Conversion Company, St. Paul, Minn. Filed August 28, 1942—Issued May 15, 1951.

A hot-moldable composition of feltable fibers comprising essentially and in substantially uniform distribution, feltable fiber-forms of mechanically defibered wood containing substantially all the content of the wood from which the fibers are derived including all the cellulose as cellulose and including water-soluble forms of lignin and polysaccharides which forms are products of reaction in the wood of natural water-insoluble constituents of the wood in an environment of steam at temperatures above 212° F. and at which lignin in the wood is softened, and from 4 parts to about 150 parts by weight of resinous solids per 100 parts of dry fiber, said solids being adhesively united to the fibers, some of said solids being substantially thermoset resin solids as a sealing resin coat on said fibers as individual fibers, and the remainder of said solids being heat-softenable and thermosetting resin-forming solids present in an amount by weight from about 4 parts per 100 parts of dry fiber, said composition being characterized by the ability of the fibers to move one relative to the others at a softening heat for said solids, whereby to facilitate movement of fibers in a hot-molding operation.

U.S. 2,553,418 — Article Isolating Shipping Container. Gaylord Loth, Sandusky, Ohio, assignor to The Hinde & Dauch Paper Company, Sandusky, Ohio. Filed January 18, 1950—Issued May 15, 1951.

The combination with a shipping container having end walls and enclosing walls connecting the end walls and angularly disposed with respect to one another, of a pair of article isolating buffers, one adjacent each end wall, each of said buffers comprising a partition member shaped to fit within said enclosing walls and having spacing flanges along its edges, each with an outer face engaging an enclosing wall and an edge engaging an end wall, and a pocket forming member having connected walls forming an article positioning pocket spaced inwardly from the edges of said partition member, each of said pocket walls having an integral base flange lying upon and attached to said partition member, each of said base flanges extending to an edge of said partition member and forming therewith a buffer of double thickness between the pocket and enclosing wall.

Can. 473,435 — Pigment Coated Paper. Arthur E. Young and Elmer K. Stilbert, Midland, Michigan, U.S.A., assignors to The Dow Chemical Company, Midland, Michigan, U.S.A. Filed July 18, 1949—Issued May 8, 1951.

A printing paper having a coating consisting of an intimate mixture of from 8 to 30 parts of adhesive material and 100 parts of mineral pigment, said adhesive material consisting of a size selected from the group consisting of casein, starch, and soya protein and from 0.333 to 3 parts of a copolymer of from 30 to 50 per cent butadiene and 70 to 50 per cent styrene per part of the size.

A printing paper having a coating consisting of an intimate mixture of from 8 to 30 parts of adhesive material and 100 parts of mineral pigment, said adhesive material consisting of casein and from 0.333 to 3 parts of a copolymer of from 30 to 50 per cent butadiene and 70 to 50 per cent styrene per part of the casein.

Can. 473,482—Treatment of Fibrous Materials. Hendrik Christiaan Jansen, Chester, Cheshire, England, and Newton Wood Barritt, Ince, near Chester, England, assignors to Shell Development Company, San Francisco, California, U.S.A. Filed Dec. 14, 1945—Issued May 8, 1951.

A process of treating cellulosic fibrous material which comprises exposing said fibers to the vapors

SUCCESS STORY
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More mills sold of this "mighty mite of stock preparation" than of any other refiner . . . anytime, anywhere: that's the success story of the Jones HIGH-SPEED REFINER.
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of a substantially water-insoluble monoxy substituted hydrocarbon treating agent containing only carbon, hydrogen and oxygen in the molecule, said agent selected from the group consisting of the aliphatic alcohols, aliphatic ketones and aliphatic aldehydes having eight to eleven carbon atoms per molecule and mixtures of at least two members of the group consisting of aliphatic alcohols, aliphatic ketones and aliphatic aldehydes having an average of eight to eleven carbon atoms per molecule in the mixture until a film of said agent is deposited on the fibers and subsequently contacting the thus treated fibers with an aqueous solution of an anion-active wetting agent.

Can. 473,636 — Paper Having Improved Printing Characteristics. Barrett K. Green, Dayton, Ohio, U.S.A., assignor to The National Cash Register Company, Dayton, Ohio, U.S.A. Filed June 20, 1949 — Issued May 15, 1951.

Paper filled with zeolite particles having internal adsorbent surfaces.

Paper having a surface coating containing zeolite particles having internal adsorbent surfaces.

The paper of claim 1 in which the particles are selected from one or more of the group of minerals comprising analcite, chabazite, natrolite, heulandite, sodalite, helvite, and noselite.

The paper of claim 2 in which the particles are selected from one or more of the group of minerals comprising analcite, chabazite, natrolite, heulandite, sodalite, helvite, and noselite.

Can. 473,651 — Treatment of Pulp. Judson H. Holloway, Robert S. Tablee, and Arthur N. Parrett, Shelton, Washington, U.S.A., assignors to Rayonier Incorporated, Shelton, Washington, U.S.A. Filed Sept. 18, 1945 — Issued May 15, 1951.

The method of activating machine-dried high-alpha pulp in a pretreatment prior to acetylation which comprises impregnating the pulp while in sheet form with glacial acetic acid, and then immediately and while the acetic acid still is in contact with the pulp disintegrating the sheet by physically separating the fibers thereof to form a fluffy mass.

In the method of activating machine-dried high-alpha pulp, the improvement which comprises impregnating the pulp while in sheet form with glacial acetic acid in an amount varying from 15% to 150% based on the weight of the pulp, and while the acetic acid still is in contact with the pulp disintegrating the sheet by physically separating the fibers thereof to produce a fluffy mass.

In an operation for the production of cellulose acetate, the improvement which comprises drying high-alpha pulp in sheet form to from 94% to 100% bone-dry, impregnating the sheet with glacial acetic acid in an amount varying from 20% to 150% by weight based on the weight of the pulp and while the sheet contains heat from the drying operation, disintegrating the sheet while the acetic acid still is in contact with the fibers thereof by physically separating the fibers to produce a fluffy mass, and passing the disintegrated pulp at once to an acetylating operation, whereby the fibers are completely or substantially completely dissolved.

In an operation for the production of cellulose esters, the improvement which comprises impregnating a sheet of high-alpha cellulose with an acid from the group consisting of propionic acid and butyric acid in an amount sufficient merely to dampen the fibers, and then while the acid still is in contact with the fibers of the sheet mechanically disintegrating the sheet to produce a fluffy mass.

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	June 2	June 9	June 16	June 23	June 30
1951	100.1	104.1	101.5	99.4 r	95.4 r
	June 3	June 10	June 17	June 24	July 1
1950	92.6	96.4	97.3	89.5	97.7

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	92.6	93.6	96.7	95.4	96.4	97.7	85.3	99.6	96.1	101.0	99.6	91.2	95.8
1951	99.3	101.3	102.3‡	103.1‡	102.5‡	100.4‡							

‡ Preliminary.
r Revised.

COMPARATIVE YEARLY SUMMARIES

	1944	1945	1946	1947	1948	1949	1950	1951
Year to date	88.6	88.9	100.4	105.5	99.8	87.5	96.0	101.5
Year Average	88.1	89.4	100.1	104.3	96.2	88.6	95.8	

PAPERBOARD OPERATING RATIOS†

	June 2	June 9	June 16	June 23	June 30
1951	100	102	103	103	103
	June 3	June 10	June 17	June 24	July 1
1950	83	94	93	94	94

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	88	92	91	92	91	94	82	100	96	102	101	95	94
1951	102	105	104	105	104	103							

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: The chart shows the ratio through December 1950 on the basis of 6-day capacity. Beginning with January 1951 the ratio is shown on the new basis of normal 6- and 7-day capacities. Corresponding weekly and monthly ratios for 1950 on the new basis, shown in the tables above, are somewhat lower.

Paperboard operating ratios continue on the basis of a 6-day week.

† Per cents of operation based on "inch-hours" reported to the National Paperboard Association.

More than 23 million acres of woodland are certified under the American Tree Farm System to grow trees as a farm crop.

OBITUARIES

Otis Bascom King 41, manager of manufacturing of the Container Division of International Paper Co., died of a heart attack July 2. He had been in charge of Manufacturing for the Division since 1944 when their executive offices were first centralized in New York.

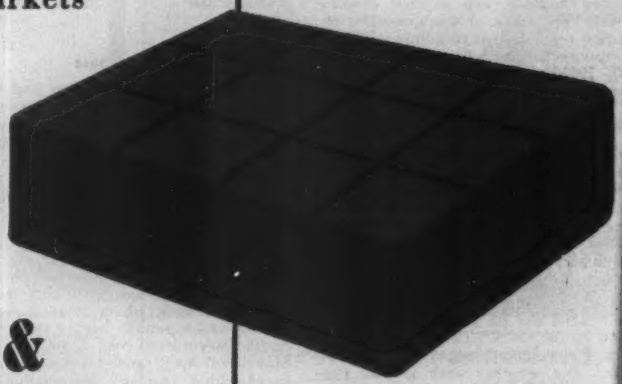
He was employed by International eighteen years ago. During those years he was located at various Southern Kraft Division mills. Mr. King was widely known in the board and container industries and served on many technical committees during his career. During World War II, he spent 2½ years in Washington, D. C., working on industry matters as a member of the War Production Board.

Harry W. David, president of the Morgan Paper Co., Inc., Lititz, Pa., died suddenly on ship board enroute to England, July 2. Mr. David was associated with the paper business for sixteen years.

George Williamson, 73, chairman of the board of Strathmore Paper Co. died in Des Moines, Iowa on July 3. Mr. Williamson was active in the affairs of the industry serving on many committees including that of the TAPPI Joint Textbook Committee.

Lyddon & Co.

exporters of wood pulp
to all world markets



Parsons & Whittemore

paper exporters
wood pulp

London
Paris
Zurich
Stockholm
Oslo
Sousse
Montreal
Buenos Aires
Sao Paulo

10 East 40th Street, New York 16, N.Y.

GOVERNMENT GOSPEL

Continuation of Ceiling Prices

Ceiling Price Regulation 22 and companion regulations provided for a number of rollbacks to become effective after June 30, 1951. Those rollbacks, however, are prohibited by the Joint Resolution enacted into law on June 30, 1951, which extended the Defense Production Act until July 31, 1951.

This resolution was adopted as a temporary limitation, pending further consideration by Congress. The Director of Price Stabilization is of the opinion that pending further clarification and study manufacturers' ceiling prices should be kept at their existing level. The effect of this general overriding regulation is to eliminate all requirements for rollbacks after June 30, 1951, and to freeze price ceiling provisions in effect on June 30, 1951.

Sellers of commodities subject to CPR 22 and the companion regulations who have put those price ceiling regulations into effect on or before June 30, 1951, as to any commodity or service, continue to price under those regulations for that commodity or service. Otherwise the seller continues to apply the GCPR.

Sellers who have not yet filed their reports under the regulations in question need not do so until further action by the OPS. This provision does not countermand reports already on file. But whether such reports containing proposed increases in ceiling prices became effective on June 30, 1951, many depend on the waiting provisions of the regulation. Under CPR 22, reports of ceiling price increases received by OPS after June 14, 1951, will not have the effect of establishing a ceiling price in effect on June 30, 1951, since the 15-day period after date of receipt will not have expired on or before June 30, 1951. Ceiling prices for commodities covered by such filings will, therefore, remain at their GCPR level.

Special circumstances have rendered impracticable consultation with industry representatives prior to the issuance of this regulation.

Steel, Copper and Aluminum Ruling

OTTAWA—Canadian Government announces arrangements have been completed which will allow the Canadian manufacturers to participate on an equal footing with U. S. companies on the allocation of steel, copper and aluminum, though it is believed unlikely that the plan will provide priorities assistance before September. It is also understood that priority classifications can be obtained outside the actual defense production for forest products and a list of other essential products.

Wholesalers' Sales Increase

WASHINGTON, D. C.—Paper and related products wholesalers reported gains for the first 5 months of 1951 of 43 percent over the same months last year, and for May, 1951, of 40 percent over the preceding May, in Census Bureau returns this week. Sales were 7 percent above those in April.

Middle Atlantic states wholesalers reported sales for the five months of 1951 rose 53 percent over the corresponding 1950 period, with May business 49 percent above that a year earlier, and 6 percent higher than for April. Inventories rose 3 percent in May over April, and 2 percent compared with a year ago. Nationally, inventories were 10 percent higher in May than a year ago, and up 3 percent from April levels.

For New England, sales for five months of 1951 rose 42 percent over the same months a year ago, and for May, were 26 percent higher than a year earlier, and 5 percent above those for April. Inventories in the New England states fell 1 percent from April level but were up 8 percent from May, 1950.

On the Pacific Coast, sales for five months of 1951 rose 34 percent over 1950 level, 4 percent over April, and 35 percent over May, 1950. Inventories were up 24 percent from May, 1950 and 2 percent over April.

South Atlantic states reported sales for 5 months up 47 percent, and for May, 42 percent above those a year ago, and 4 percent higher than for April. Inventories were not shown.

For the East North Central states, sales rose 40 percent for the five months of 1951, and 36 percent for May compared with a year earlier, and 9 percent compared with April. Inventories rose 7 percent from May a year earlier, and 4 percent over April.

Newsprint for Germany

BONN, Germany—The West German government has allocated newspaper publishers $1 million to buy newsprint in Canada and the United States.

German publishers had complained about the high price of newsprint, but at $193 a ton German newsprint was cheap compared with the world price of $350. The German production capacity is 14,000 tons a year.

Herz Named Price Executive

Gene Herz has been named OPS regional price executive for New York and northern New Jersey.

Mr. Herz, former New York and Chicago business executive and manufacturer, comes to the OPS from the NPA.

As regional price executive he heads the office which administers and interprets the stabilization regulations for the business community in this region, including export-import, food and restaurants, consumer goods, industrial materials and manufactured products, fuels and chemicals.

Increase Canadian Freight Rates

OTTAWA — Adding more costs to operations of Canada's pulp and paper industry is the decision by the Board of Transport Commissioners here to allow the Canadian railways an increase of 12 percent in their freight rates. Eight of the ten provinces, excluding only Ontario and Quebec, opposed the application by the railways for higher freight rates at this time.

LONG ON EVERYTHING YOU REQUIRE OF CENTRIFUGAL CASTINGS!

Long in quality, and long on required physical properties. Sandusky Castings have provided satisfaction for more than forty years.

Always specify CHIEF SANDUSKY to your machine builder, and you will have the best in centrifugal castings . . . uniform, dense, and free from porosity.

• CHIEF SANDUSKY CENTRIFUGAL CASTINGS • SANDUSKY, OHIO

SANDUSKY FOUNDRY AND MACHINE CO.

Clinton's

PM 3011 Pearl Starch

(For enzyme conversion)

● Specifically processed and controlled for ease of conversion under all practical mill conditions. Also, special grades of starch for:

- BEATERS
- COATING
- LAMINATING
- TUBSIZING

CLINTON

CLINTON FOODS INC., CLINTON, IOWA

DEZURIK EASY-OPERATING PLUG VALVES

TESTED AND PROVED

IN A THOUSAND MILL USES

There's hardly a valving job in pulp-and-paper mill operation where DeZurik Valves haven't been *proved superior* in actual, successful service. They're known throughout the industry for leak-free, trouble-free performance on all types of flow, from air to clay, from fibrous matter to resinous compounds. The exclusive DeZurik RUBBER-FACED PLUG is self-compensating—it keeps closing drip-tight *every time on any line!*

DEZURIK SHOWER CO.

SARTELL MINN

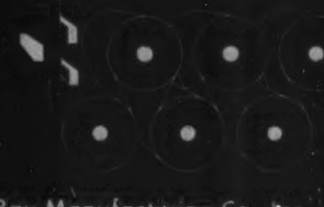
Red Ray Burners

increase *Drying Capacity*

Red-Ray Burners are extremely adaptable; they can be operated on natural gas, manufactured gas, butane or propane.

Controls and safeguards are furnished as required by the specific installation.

Further information concerning your particular drying requirements will be furnished by us without obligation. We invite your inquiry.



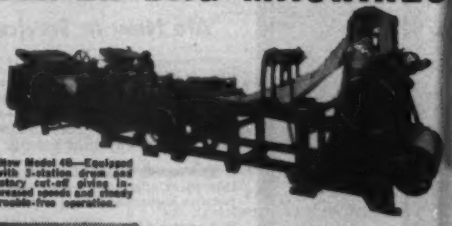
Red Ray Manufacturing Co., Inc.

455 West 45th Street New York 19, N.Y.

25% Greater Production!

POTDEVIN SATCHEL BOTTOM

PAPER BAG MACHINES



New Model 46—Equipped with 3-station drum and rotary cut-off giving increased speeds and steady trouble-free operation.

ANILINE PRESS

S.O.S.

Makes a wide range of bags from 5 lb. sack to huge super-market carrier bags. Has adjustable former to vary sack widths, trade-mark imprinting unit, 2 hole punch and scoring device for string handles, roll lifting mechanism for easier loading.

Can be directly connected to a Potdevin multi-color aniline press. Compensator and electric eye can be added for pre-printed papers as well as liner for two-wall (duplex) bags.

Literature on request.

POTDEVIN MACHINE CO.

1223 38th Street, Brooklyn 18, N. Y.

Designers and manufacturers since 1893 of equipment for Bag Making, Printing, Coating, Gluing and Labeling

POTDEVIN

How H & T Coagulators Save Space & Cost

1. Over 100,000,000 gallons of water daily are purified in H&T Coagulators. That's two-thirds of a gallon for every man, woman and child in the U.S.
2. Many of these H&T water purifiers were purchased because H&T Coagulators have a low initial cost.
3. Others were bought because of low operational costs—Small amounts of inexpensive chemicals are used.
4. Some buyers like our unconditional guarantees of capacity, effluent quality and workmanship.
5. So if you have a river clarification problem, a white water problem, a water softening problem, or a waste water purification problem, check with H&T.

OVER 100,000,000 GALLONS OF WATER ARE PURIFIED DAILY IN H & T COAGULATORS

SEND FOR BULLETIN E-1

HUNGERFORD & TERRY, INC.

CLAYTON 4, NEW JERSEY

WEST VIRGINIA PULP and PAPER COMPANY

230 Park Ave.
New York 17, N. Y.

35 East Wacker Drive
Chicago 1, Ill.

Lincoln-Liberty Bldg.
Philadelphia 7, Pa.

583 Market St.
San Francisco 5, Calif.

Manufacturers of West Virginia Mill Brand Papers

SUPERCALENDERED
ENGLISH FINISH
LITHOGRAPH
LABEL
OFFSET
EGGSHELL
MUSIC
POSTER
BOND
WRITING
ENVELOPE
MIMEOGRAPH
INDEX BRISTOL
POST CARD
COVER
CUP AND CONTAINER
FILE FOLDER
TAG
COATED
MACHINE COATED

KRAFT LINER BOARD
KRAFT CONVERTING AND KRAFT ENVELOPE

MILLS

Mechanicsville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

Here's Why More Than

30,000 FABRICATED SCREEN PLATES

Are Now In Service

"Hardy" fabricated screen plates, made by Magnus, have a high-strength, thin-sheet design—specially engineered for maximum flow. That's why they assure:

1. **Increased Plate Capacity.** The thin sheet eliminates relief milling—permits higher capacity per plate.
2. **Longer Life.** Slots remain sharp, side walls highly polished. There's greatly improved resistance to corrosion.
3. **High, Sustained Yield.** You get consistent, uniform quantities of cleaner pulp.

It all adds up to improved performance at reduced operating cost. Complete information is yours on request.

MAGNUS METAL CORPORATION, *Fitchburg, Mass.*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND MONEL
VALVES: GATE, SWING CHECK, SLOW, GLOBE, ANGLE AND "Y"

Photo, Courtesy J. M. Huber Corporation

Single Instrument Measures Smoothness, Porosity and Softness of Paper

You just interchange the lower test plates in the GURLEY-HILL S-P-S Tester to convert it into an instrument for testing either smoothness, porosity or softness of any type of paper, by measuring a given air-leakage over or through the paper.

This 3 in 1 laboratory "assistant" is simple to operate, quick and accurate, and a real utility instrument where printing quality of paper must be reliably measured.

Bulletin No. 1400 describes the S-P-S Tester as well as other Gurley paper testing instruments. It's worth writing for today. W. & L. E. Gurley, 520 Fulton St., Troy, New York.

CLEARING HOUSE

HELP WANTED

MEN WANTED—POSITIONS OPEN

We can place—assistant manager for board mill; asst. paper mill supt.; bleach house foreman; chemists, chemical engineers and laboratory men $300-$900 month; chief chemist for bleached kraft and board mill.

Chief power plant engineers (2); plant engineer $7,500 to $9,000; electrical engineers and asst. electrical engineers; tour bosses, Fourdrinier, Cylinder and Yankee machines; head beater engineer board mill; machine tenders and back tenders.

LIST YOUR CONFIDENTIAL APPLICATION WITH US to keep informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston 8, Mass.

SPECIALISTS IN PLACING PULP AND PAPER MILL EXECUTIVES J-13

PACKAGING SPECIALIST

Well-established progressive multiproduct company wants chemist or engineer familiar with paper, paper board, and other packaging materials to assist in research packaging laboratory located on Eastern seaboard.

Employee will apply background to improvement of present packaging and development of new types of packaging. Details of education, experience, salary desired, and recent photograph should be included in reply.

Address Box 51-340 care Paper Trade Journal J-13

Wanted — OPERATING ENGINEER to take charge of operations and maintenance of a paper mill power plant, size—5,000 KVA — steam generation, about 80,000 pounds per hour. Mill located in Southwest. In reply state qualifications, previous experience and salary expected.

Address Box 51-331 care Paper Trade Journal. J-20

Wanted: Supervisor for pulp and paper research group of 6 to 8 men in laboratory of upper midwest mfgr. of bleached and unbleached groundwood, sulphite and kraft pulps and printing and converting papers. Must be a graduate chemist or chemical engineer well grounded in paper chemistry and manufacturing processes. Prefer man 35 to 45 years old with both production and development exp. in above fields and a combination of a creative imagination with a practical approach to development problems. Paper coating exp. desirable. In reply give personal history, training, exp. and salary expected. Address Box 51-335 care Paper Trade Journal. J-13

PROJECT ENGINEER—CALIFORNIA. 5 years experience. Processes and machinery for manufacture of floor coverings, wallboards, insulations, building materials. Permanent position. Salary open. Moving expenses allowance. FABCO PRODUCTS INC., 1350 Powell Street, Emeryville, California. Jy-13

HELP WANTED

AGGRESSIVE SALES ENGINEER

Opportunity to join well known established machinery firm. Technical ability and paper making background necessary. Knowledge of beating and pulping process and equipment desirable. Some sales experience or sales inclination helpful. Must be able to travel in territory. Tell us about yourself in your letter. Address Box 51-301 care Paper Trade Journal. TF

PLANT ENGINEER—Bldg. Materials and Plastic Floor-covering Manufacturer, new large-scale New Jersey plant. Applicants must have minimum 6 years plant experience in maintenance, operations and design. Must be familiar with wide variety of process plant equipment and utilities systems. Must be college graduate engineer. Please submit resume with reply. Box No. 51-300, care Paper Trade Journal. A-3

CHEMIST OR CHEMICAL ENGINEER: One of the leading chemical companies desires chemist or chemical engineer in its laboratory research on and uses for new products developed in existing research department. At least 3 years experience essential in one or more of following products: waxes, paper coatings, polyethylenes and other plastics. Permanent position, good salary, liberal employment benefits. Give complete information in letter. Replies confidential. Address Box 51-322 care Paper Trade Journal. J-23

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. E. W. BIXBY, INC. —117 Dun Bldg., Buffalo, 3, N. Y. TF

WANTED—Research chemist, interested in exploration of the development and substitution of synthetic materials for natural cellulosic products. Fine opportunity for the right man to engage in long term development project. Location in New York State. Send complete resume of industrial training and education with letter of application to Box 51-345 care Paper Trade Journal. S-28

WANTED — Machine Tenders and Back Tenders for corrugating medium and liner mill. Fourdinier and cylinder machines. Located in Western Pennsylvania; good working conditions; pleasant surroundings and very good labor relations. Call collect—Tarentum 1470, TARENTUM PRODUCTS CORPORATION, Tarentum, Pa. TF

MID-WESTERN FOURDRINIER SPECIALTY MILL has opening for experienced Production Superintendent. References required. Address Box 51-278 care Paper Trade Journal. A-31

WANTED — EXPERIENCED, COMPETENT PURCHASING AGENT for an eastern chipboard mill. Must be capable and fully experienced. Furnish details of experience, capabilities and references. Excellent opportunity. Address Box 51-133 care Paper Trade Journal. TF

HELP WANTED

WANTED — TOP GRADE SALESMAN-AGER for an eastern chipboard mill. Fully experienced and capable. Furnish details of experience, capabilities and references. Excellent opportunity. Address Box 51-78 care Paper Trade Journal. TF

WORKING SUPERINTENDENT for small, fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 51-87 care Paper Trade Journal. TF

WANTED — Technical Service Director for long established Mid-western integrated Kraft mill manufacturing Kraft and specialties. Experience necessary. Qualified party will supervise control of paper and pulp mills. Excellent laboratories and working conditions. Applicant should submit complete qualifications. Write Box 51-344 care Paper Trade Journal. J-20

SALESMAN to sell Chip Corrugating Medium to corrugating board manufacturers. Must be thoroughly experienced and have established following. Substantial salary and commission. Address Box 51-340 care Paper Trade Journal. J-13

SITUATIONS WANTED

PLANT MANAGER—Paper and Board and their conversion; wants challenging opportunity. Highly successful in organization; administration; labor relations and high level production. Presently employed. Address Box 51-63 care Paper Trade Journal. J-27

CHEMICAL ENGINEER — 31, with good technical and commercial background available. Presently superintendent of stock preparation at midwestern kraft and sulphite specialty mill, in charge of both beating and bleaching. 10 years experience in selling and making various kinds and grades of paper. Member of SAPI. Resume and references available. Address Box 51-331 care Paper Trade Journal. J-13

BEATER ENGINEER wants position. Married, temperate habits. Accustomed to all grades. Can take full charge of beater room. Address Box 51-330 care Paper Trade Journal. J-13

SALESMAN—10 years experience selling to paper manufacturers. 5 years sales manager paper jobbing house. Wish to represent paper mill, converter or company serving paper manufacturers in Middle Western States. Address Box 51-354 care Paper Trade Journal. A-3

FOR SALE

FOR SALE
42" CAMACHINE TYPE 10 MODEL 5

Guaranteed complete and in good condition, as a used equipment. Immediate delivery. Address Box No. 51-355 care Paper Trade Journal. J-13

FOR SALE—1—122" Heavy Duty Singis Knife Horse Cutter, suitable for Board or Pulp. Address Box 51-275 care Paper Trade Journal. TF

RATES FOR CLEARING HOUSE ADVERTISING

HELP WANTED—10c a word. Double rate for heavy face type. Minimum charge $3.50.

SITUATIONS WANTED—10c a word, double rate for heavy face type. Minimum charge $3.50. If repeated 7x rate will be charged for each consecutive repetition.

Classified advertising space may also be purchased at $5.00 per single column inch. All classified advertisements are payable in advance. If box number is used—10 cents additional.

FOR SALE—10c a word. Double rate for heavy face type. Minimum charge $3.50.

WANTED—10c a word. Double rate for heavy face type. Minimum charge $3.50.

OPPORTUNITIES—10c a word. Double rate for heavy face type. Minimum charge $3.50.

Address replies to advertisements appearing under Box Numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 18, N. Y.

FOR SALE

ROLL DOCTORS
CONVERTERS

Purchasers of all Types of Paper

NEW USED ODD SIZES PACKING AND WRAPPING PAPERS

Consult us

Southwest's Leading Market

Phone-Write or Wire

PHONES CE. 9200-9201-9202

MISSOURI PAPER STOCK CO.
22nd & SCOTT AVE, ST. LOUIS, MO.

CHICAGO OFFICE
BONCO PAPER SUPPLY CO. 919 N. MICHIGAN
SU. 7-7849

FOR SALE

GOOD VALUES FOR SALE

52" Cameron type 8 model 5 Slitter.
42" Cameron 26-2A Slitter, like new.
72" Cameron type 4 model 10 Slitter.
76" Cameron Rewinder.
48" Kidder type CH Rotary Slitter.
42" Moore & White Sheeter with Layboy.
45" Hamblet Sheeter.
49" and 58" Finley Sheeters.
110" Hamblet Sheeter with extension delivery and back-stands.
36" Beck Sheeter, no layboy.
65" Sheridan Auto. Power Cutter.
NEW Baling Presses, both hand and power.
NEW Hamblet Sheeters, any size, for any purpose.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18
(Plant at Stamford, Conn.) TF

FOR SALE—65" Seybold Paper Cutter; 36" Slitter & Rewinder, 48" Sheeter with Layboy; 29 x 40 Thomson Platen Die Cutter; 6" Brightwood Box Machine. Address Box 51-217 care Paper Trade Journal. TF

FOR SALE—74" Knowlton Traveling Shear Cut-off Knife.—Bargain. Address Box 51-105 care Paper Trade Journal. TF

FOR SALE

1—150" number 19 Cameron slitter & winder
1—100" Cameron Slitter part
1—38x100" face suction press roll
1—Brand new Allis Chalmers steam barker with reducer and pump, in original crate
3—Hydraulic presses, 500 ton, plates 30 x 32, with pump
1—56x240" suction couch roll with gear drive
3—Rubber covered press rolls 32" dia. x 232" face, 1½" rubber
1—Granite top press roll 26 x 231" face
3—232" Vickery doctor assemblies, one right hand and one left hand
1—Harmon twelve plate screen, plates cut about .014, with scraper attachment
1—100" Veith Silos
5—Dryers 60 x 174", 20—48" x 40"

FRANK H. DAVIS COMPANY
175 Richdale Avenue, Cambridge, Mass.
J-27

FOR SALE—1—Valley Iron Works Stock Inlet. Used with 133 inch wire making 10 pound to 40 pound paper. From 350 to 600 feet per minute. Print will be furnished interested parties. DUNN PAPER CO., Port Huron, Mich. J-13

FOR SALE

1—Sandusky Couch Roll—126" drilled face x 22" diameter.
1—123" 3 bowl revolving reel.

BEARINGS
72—Top and bottom Dryer Bearings 7" diameter x 12" long.

BEATERS
1—Dilts Iron Tub Laboratory Beater. Beater roll 14" diameter x 10½" face.
1—Noble & Wood Cast Iron Beater—1000# capacity—roll newly refilled.

CALENDER STACKS
1—9 roll 68" Calender Stack.
1—3 roll pressure calender—33" x 108".
1—72" 4 roll calender stack. (Extra heavy duty).
1—84" Smoothing Calender Stack, 2 Iron Rolls, 2 Cotton Rolls.

CHEST
1—Cast Iron Stock Chest, 23' long x 6' high. (With agitator).

CHIPPER
1—46" Murray 4 knife Chipper—anti-friction bearings.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
1—Jeffrey Hammermill.

CYLINDER MOLDS
3—30" diameter x 72" face.
1—30" diameter x 79" face
3—34" diameter x 54" face.
1—36" diameter x 96" face.
1—48" diameter x 72" face.
4—36" diameter x 78" face.
1—30" diameter x 92" face.
1—36" diameter x 72" face.

DRIVES
1—#5½ Reeves Drive.
1—#4 Reeves Drive
1—Reliance Electric Drive, complete with 5 gear head motors.
3—#3 Reeves Drives (totally enclosed).

DRYERS
1—Complete unit, consisting of 6 dryers, 36" diameter x 58" face, including frames, gears, anti-friction bearings.
7—24" diameter x 48" face.
1—48" diameter x 91" face.
3—36" diameter x 96½" face
1—36" diameter x 143" face.
1—24" diameter x 130" face.
1—48" diameter x 70" face.
1—48" diameter x 82" face.
3—Dryers 48" diameter x 134" face.
1—24" diameter x 92½" face.
2—38" diameter x 49" face.
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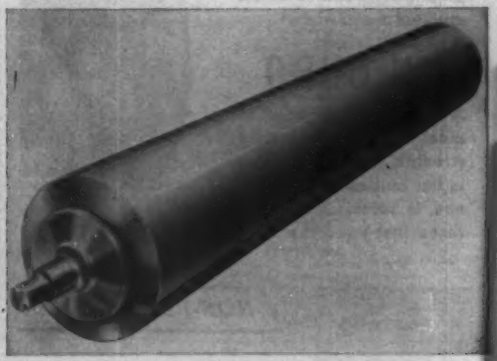

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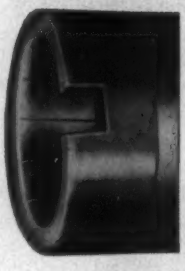

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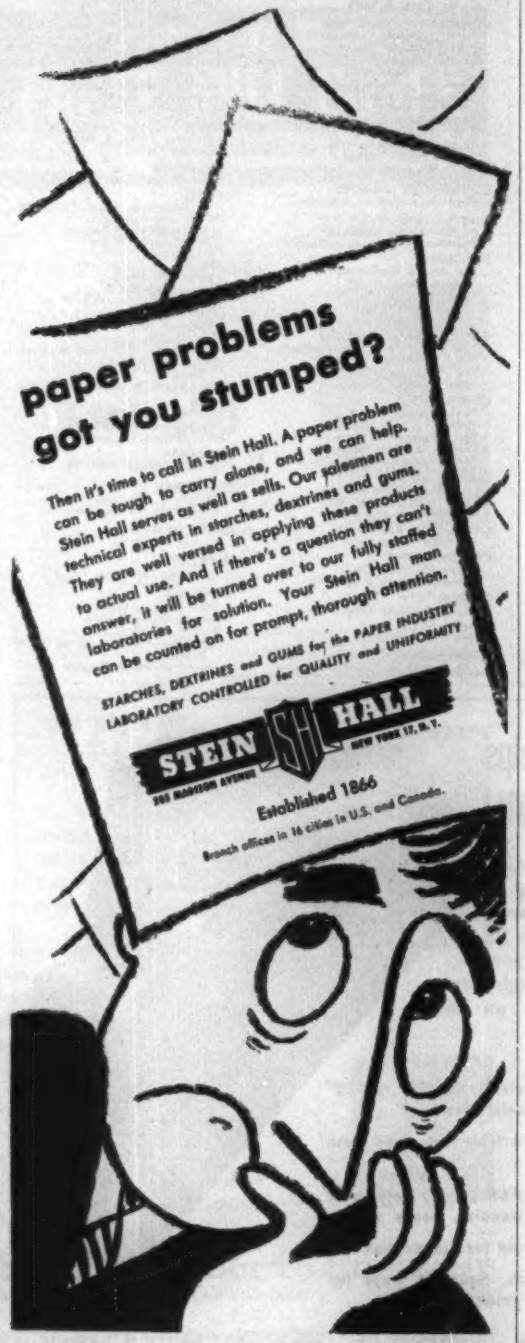
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Babcock & Wilcox Co.
Blaw Knox Company
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Lukenweld
Paper & Industrial Appliances
Pusey & Jones Corp.

DISPERSING AGENTS
Calgon, Inc.
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
The Bagley & Sewall Company
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell United Co.
Ludding Engineering Corp.
The Moore & White Co.
Rice Barton Corperation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
The Bagley & Sewall Company
Bird Machine Company
Ludding Engrg. Corp
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Simonds Saw & Steel Co.

DRIERS
The Bagley & Sewall Company
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Ned-Ray Mfg. Co., Inc
Rice Barton Corporation
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Bird Machine Co.
Black Clawson Company
Ditz Machine Works
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs-Brower Company, Inc
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

DRUM WINDERS
Manchester Machine Co.
Rice Barton Corporation

DRYER DRAINAGE
Stickle Steam Specialties Co

DRYER ROLL PYROMETER
Thwing-Albert Instrument Co

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
M. W. Jenkins Sons, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

DUSTING BRUSHES
M. W. Jenkins Sons, Inc.

DYESTUFFS
American Cyanamid Company Calco Chemical Div.
Bunge Pulp & Paper Co.
Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co

EMBOSSING MACHINES
Ditz Machine Works
Egan, Frank W., & Co.
John Waldron Corp.

EMBOSSING ROLLS
The Appleton Machine Co.
Gibbs-Brower Company, Inc.
Holyoke Machine Co.
Northern Engraving & Mch. Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.

EVAPORATORS
Davis Engrg. Corp.
Conlin-Birmingham Mfg. Co Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

EXPANDERS
Mount Hope Machinery Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Hoffl Company, Inc.
Merrick Scale Mfg. Co.
The Permutit Company
Stephens-Adamson Mfg. Co.

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Morey Paper Mill Supply Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

FELT CLEANERS
Calgon, Inc.
General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
Bird Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FELT GUIDES
Black Clawson Company
Frank W. Egan & Co.
Gilbert & Nash Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Cyanamid Company, Industrial Chemicals Division
A. M. Meinecke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
Bird Machine Company
Holyoke Machine Co.
J. M. Huber Corp.
Hungerford & Terry, Inc.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
The Bagley & Sewall Company
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

FLEXIBLE COUPLINGS
Egan, Frank W., & Co.
Lovejoy Flexible Coupling Co.
John Waldron Corp.

FLOORING, GRATING AND TREADS
The Goodyear Tire & Rubber Company
Norton Co.

FLOW BOXES, STAINLESS-CLAD
Lukens Steel Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Clark Equipment Company Industrial Truck Division
Elwell Parker Elec. Co.
Towmotor Corp.

FORMATION TESTERS
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

FOURDRINIERS
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
The Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co

FREENESS TESTERS
Testing Machines, Inc.
Williams Apparatus Co.

FURNACES
Hoeft Company, Inc.

GASKETS
The Goodyear Tire & Rubber Company

GEARS
The Bagley & Sewall Company
Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

GRAPPLES
Blaw-Knox Company

GRAVITY FILTERS
Holyoke Machine Co.

GRINDERS
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

GUIDES
The Bagley & Sewall Company
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works

GUMS
National Starch Products, Inc.
Stein-Hall Co., Inc.

HEAT EXCHANGERS AND RECOVERY SYSTEMS
Stickle Steam Specialties Co.
Westinghouse Electric Corp.

HEATING, VENTILATING & AIR CONDITIONING
The Appleton Machine Co.
E. D. Jones & Sons Co.
General Electric Co.
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.
Valley Iron Works Co.

HOSE (Air, Water, Suction, etc.)
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Hayden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company Industrial Chemicals Division
B. F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TRACTORS
Clark Equipment Company Industrial Truck Division
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co

INSTRUMENTS, TESTING AND MEASURING
Brown Instrument Co.
Bunge Pulp & Paper Co.
Cambridge Instrument Co.
General Electric Company
W. & L. E. Gurley
B. F. Perkins & Son
Photovolt Corp.
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co
Williams Apparatus Co.

JOINTS
The Bagley & Sewall Company
Beloit Iron Works
Johnson Corp.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
Heppenstall Company
E. D. Jones & Sons Co.
The Moore & White Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KRAFT WRAPPING PAPERS
Canadian Newsprint Supply Co.

LABORATORY CORRUGATOR
Thwing-Albert Instrument Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

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Clark Equipment Company Industrial Truck Division

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LINTER PULP
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Stephens-Adamson Mfg. Co.
The Wellman Engrg. Co.

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Farrel-Birmingham Co.
Lobdell Co.
Stephens-Adamson Mfg. Co.
Testing Machines, Inc.

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Bunge Pulp & Paper Co.
Moore & Munger
Sun Oil Company

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Stickle Steam Specialties Co
Williams Apparatus Co., Inc.

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Fairbanks, Morse & Co.
General Electric Company
Reliance Electric & Engrg. Co

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Canadian Newsprint Supply Co

NICKEL AND NICKEL ALLOYS
The International Nickel Co

NOZZLES
Spray Engrg. Co.

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Clark Equipment Company Industrial Truck Division
Johnson Corporation
The Moore & White Co.
Shartle Brothers Machine Co.

PALLET TRUCKS
Clark Equipment Company Industrial Truck Division

PAPER MACHINE DRIVES
The Bagley & Sewall Company
Manchester Machine Co.
Rice Barton Corporation

PAPER MACHINES
The Bagley & Sewall Company
Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc
Thomas W. Hall Co.
Lakeweld
Moore & White Co.
Pusey & Jones Corp
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc
Thomas W. Hall Co.
Hudson Sharp Machine Co
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Moore & Munger
Sun Oil Company

PARAFFIN WAX EMULSIONS
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
Ditts Machine Wks.
Ivan W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.
Moore & White Co.
Pendevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

PEBBLE MILLS
F. L. Smidth & Co.

PERFORATED METAL
Allis-Chalmers Mfg. Co.

pH METERS
Cambridge Instrument Co.
Thwing-Albert Instrument Co

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Armco Drainage & Metal Products, Inc.
Babcock & Wilcox Co.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
National Tube Co.
Walworth Company

PIPE FITTINGS
Armco Drainage & Metal Products, Inc.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
Walworth Co.

PITCH CONTROL
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
Armco Steel Corp.
Babcock & Wilcox Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co

PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
Shartle Brothers Machine Co

POPE TYPE REELS
Egan, Frank W., & Co.
Manchester Machine Co.
Rice Barton Corporation

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co

PRESERVATIVES
E. I. du Pont de Nemours & Co
General Dyestuff Corp.

PRESS ROLLS
Beloit Iron Works
Rice Barton Corporation

PRESSURE FILTERS
Holyoke Machine Co.

PRESSURE VESSELS
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.

PRESSES
Black Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
The Moore & White Co.
Pendevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co.

PULLEYS
Lovejoy Flexible Coupling Co.
Rice Barton Corporation

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co

PULP CLEANERS
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
Crane Company
Record Fdy. & Mach. Co.
Shartle Brothers Machine Co

PULPERS
Apmaw, Inc.
Bauer Brothers Co.
Ditts Machine Works
E. D. Jones & Sons Co.
Mordon Machines Co.
Shartle Brothers Machine Co

PULPS
Alpha Cellulose Corp.
Brown Company
Bunge Pulp & Paper Co.
Getteman & Co., Inc.
Lyddon & Co. (America), Inc
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co
Resingoache Co., Ltd.

PULPSTONES
Norton Company

PULP TESTERS
Paper and Pulp Testing Laboratories
Williams Apparatus Co., Inc.

PULVERIZING MILLS
Combustion Engineering-Superheater, Inc.
F. L. Smidth & Co.

PUMPS
Allis-Chalmers Mfg. Co.
Agency, Inc.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
DeLaval Steam Turbine Co
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Gibbs-Brower Company, Inc
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Roots Connersville Blower Corp
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg Co

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

RAG COOKING PROCESSES
The Kinsley Chemical Company
General Dyestuff Corp.
Rohm & Haas Co.

RAG CUTTERS
Gibbs-Brower Company, Inc.
S. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECOVERY SYSTEMS
Babcock & Wilcox Co
Chicago Bridge & Iron Co
Combustion Engineering-Superheater, Inc.
Moore & White Co.
D. J. Murray Mfg. Co
Pusey & Jones Corp.
Ross Engineering Corp., J. O
Valley Iron Works Co.

REELS
The Appleton Machine Co
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Moore & White Co.
Rice Barton Corporation
Rodney Hunt Machine Co
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg Co.

REFINERS
Appleton Machine Co.
Baker Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc
E. D. Jones & Sons Co
Mordon Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Sprout Waldron & Co., Inc.
Sutherland Roffner Corp.
Valley Iron Works

REGULATORS
APMEW, Inc.
Allis-Chalmers Mfg. Co
Bird Machine Company
General Electric Co.
Johnson Corp.
Shartle Brothers Machine Co
Stickle Steam Specialties Co
Taylor Instrument Companies

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc
Holyoke Machine Co.
Lobdell United Co.
Edward J. McBride Co., Inc.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, S. F., & Sons Co
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Smith & Winchester Mfg. Co
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Roll Co.

ROLL COVERS
The Goodyear Tire & Rubber Company

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co
Moore & White Co.
Pusdevin Machine Co
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROPE CARRIERS
Black Clawson Co.
The Moore & White Co
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

ROTARY KILNS
F. L. Smidth & Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SATURANTS
B. F. Goodrich Chemical Co

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Pusdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.

SAWS
Simonds Saw & Steel Co.

SCALES
Fairbanks, Morse & Co
Merrick Scale Mfg. Co
Testing Machines, Inc

SCREEN PLATES
Bird Machine Company
Parkhurst Screen Plate Co
Magnus Metal Corp
Marvy Paper Mill Supply Co
Testing Machines, Inc

SCREENS
Allis-Chalmers Mfg. Co
Appleton Wire Works
Appleton Machine Company
The Bagley & Sewall Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc
E. D. Jones & Sons Co
Moore & White Co.
D. J. Murray Mfg. Co
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Stephens-Adamson Mfg. Co.
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Valley Iron Works Co.
Williams Apparatus Co., Inc.

SHEETERS
Jagenberg-Werke Akt. Ges.

SHOWER PIPES
Bird Machine Company
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.
Gibbs-Brower Company, Inc.

SIZE PRESSES
Manchester Machine Co.
Rice Barton Corporation

SIZING
American Cyanamid Company
Industrial Chemicals Division
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Glidden Company
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp
Nopco Chemical Co.
Stein-Hall Co., Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SIZING TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co
Williams Apparatus Co., Inc.

SLIME CONTROL
The Dow Chemical Company
E. I. du Pont de Nemours & Co
General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SLITTERS
The Bagley & Sewall Company
Black Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Diltz Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc
Graphic Arts International Corp.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Prodevco Machine Co.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SOLUBLE OILS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

SPECIAL MACHINERY
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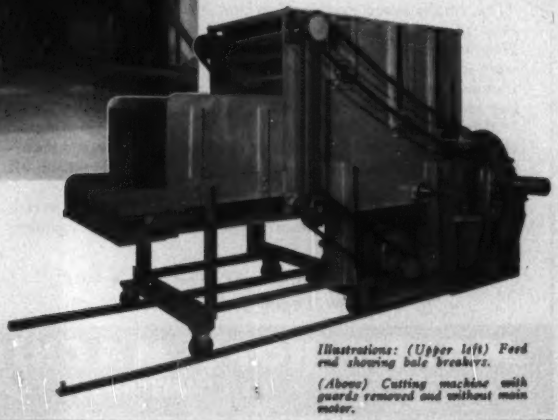

Illustrations: (Upper left) Feed end showing bale breakers.

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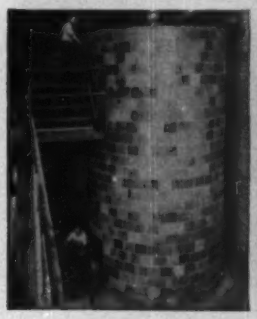

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INDEX TO ADVERTISERS

A

Adams, R. P., Co. 42
Alpha-Cellulose Corp. ..... —
Allis-Chalmers Mfg. Co. ..... —
American Cyanamid Co., Calco Chemicals Div. 49
American Cyanamid Co., Industrial Chemicals Div. ..... —
American Defibrator, Inc. ..... —
American Pulp & Paper Assn. .. —
American Steel & Wire Co. .. —
Amrul Chemical Co. ..... —
Apnew, Inc. ..... —
Appleton Machine Co., The ... —
Appleton Wire Works, Inc. ... —
Appleton Woolen Mills 54
Armco Drainage & Metal Products ..... —
Armco Steel Corp. ..... —
Asten-Hill Mfg. Co. 57

B

Babcock & Wilcox Co. ..... —
Bagley & Sewall Co. 21
Bahr Bros. Mfg. Co. ..... —
Bailey Meter Co. ..... —
Barco Oil Co. ..... —
Bauer Bros. Co. 122
Beloit Iron Works 53
Bird Machine Co. 45
Birk, F. Paul ..... —
Bixby, R. W., Inc. ..... —
Black-Clawson Co. 40
Blaw-Knox Co. ..... —
Bowsher, N. P., Co. ..... —
Brown Co. 8
Brown Instrument Div., Minneapolis-Honeywell Reg. Co. .. —
Buffalo Pumps, Inc. ..... —
Bulkley, Dunton Pulp Co. ..... —
Bunge Pulp & Paper Co. ..... —
Byron Jackson Co. ..... —

C

Caisson Wells, Inc. ..... —
Cambridge Instrument Co. .... —
Cameron Machine Co. 2
Canadian Newsprint Supply Co. —
Carnegie-Illinois Steel Corp. .. —
Carthage Machine Co. ..... —
Chemipulp Process, Inc. ..... —
Chicago Bridge & Iron Co. ... 6
Ciba Company ..... —
Clark Equipment Co. ..... —
Classified Advertising 113
Cleveland Crane & Engrg. Co.. 23
Clinton Foods, Inc. 111
Columbia Steel Co. ..... —
Combustion Engineering - Superheater, Inc. 47
Corn Products Sales Co. ..... —
Crane Co. ..... —
Crucible Steel Corp. of America 4

D

Deitz Machine Works 117
De Laval Steam Turbine Co. .. —
DeZurik Shower Co. 111
Diamond Alkali Co. ..... —
Dilts Machine Works 40
Dodge Manfg. Corp. 10
Dow Chemical Co. ..... —
Downingtown Mfg. Co. ..... —
Dracco Corp. ..... —
Draper Brothers Co. ..... —
du Pont, E. I., de Nemours & Co. Electrochemicals Dept. ..... —
du Pont, E. I., de Nemours & Co. Dyestuffs Dept. 63
du Pont, E. I., de Nemours & Co. Grasselli Chem. Dept. ..... —
du Pont, E. I., de Nemours & Co. Polychemicals Dept. ..... —
Duriron Co., The 69

E

Ebasco Services, Inc. 116
Egan, Frank, & Co. ..... —
Elixman Paper Core, Co. 99
Elwell Parker Elec. Co. 14
English China Clays Sales Corp. —

F

Fairbanks, Morse & Co. ..... —
Farrel-Birmingham Co., Inc. .. 91
Ferguson, The H. K., Co. .... —
Fitchburg Screen Plate Co. ... —

G

Geigy Co. ..... —
General Dyestuff Corp. 67
General Electric Co. .....16 & 17
Gibbs-Brower Co. ..... —
Glidden Co. ..... —
Goodrich Co., B. F. 3
Goodrich Chemical Co. ..... —
Goodyear Tire & Rubber Co. .. —
Goslin-Birmingham Mfg. Co. .. —
Gotham Ink & Color Co. 106
Gottesman & Co. .... Front Cover
Graphic Arts Int. Corp. 121
Grinnell Co., Inc. ..... —
Gulf Oil Corp. ..... —
Gurley, W. & L. E. 112

H

Hazan Corp. (Calgon, Inc.) .. —
Hall, Thomas W., Co. 114
Hamblet Machine Co. ..... —
Harris-Seybold Co. ..... —
Heppenstall Co. 9
Hercules Powder Co. ..... —
Heyden Chemical Co., Aktiven Div. 7
Hoft Co., Inc. 117
Holyoke Machine Co. ..... —
Hooker Electrochemical Co. .. —
Huber, J. M., Corp. 29
Hubinger Co., The ..... —
Hunzerford & Terry, Inc. 112
Huyck, F. C., & Sons ..... —

I

International Nickel Co. ..... —
International Wire Works .. —

J

Jackson & Church Co. 11
Jagenberg-Werke Akt. Ges. ... 121
Jeffrey Mfg. Co. ..... —
Jenkins, M. W., Sons, Inc. ... —
Johnson Corp., The ..... —
Johnson, Alvin H., & Co. ... 104
Jones, E. D., & Sons Co. 107

K

Kalamazoo Tank & Silo Co. .. —
Kinsley Chemical Co. 104
Knox Woolen Co. 117
Koppers Co., Inc. 65

L

Labeltape Co. ..... —
Langston, Samuel M., Co. .... —
Lindsay Wire Weaving Co. .. 51
Lobdell-United Co. ..... —
Lockport Felt Co. 18
Lodding Engineering Co. .... —
Lovejoy Flexible Coupling Co. . —
Lukens Steel Co. ..... —
Lydon Co. 109
Lynch Corp. 127

M

Magnus Metal Div., Nat. Lead Co. 112
Main, Charles T., Inc. 106
Manchester Machine Co. 36
Marietta Concrete Corp. ..... —
McBride, Edward J., Company. 117
Mead Sales Co., The ..... —
Meincke, A. M., & Son ..... —
Meisel Press Mfg. Co. ..... —
Merrick Scale Co. ..... —
Michigan Steel Casting Co. ... 104
Mixing Equipment Co. ..... —
Monsanto Chemical Co. 61
Montague Machine Co. ..... —
Moore & Munger Co. ..... —
Moore & White Co. 30
Moorhead Electrical Machinery Co. ..... —
Morden Machines Co. ..... —
Morey Paper Mill Supply Co. . —
Morningstar, Nicol, Inc. ..... —
Mount Hope Machinery Co. .. 123
Murray, D. J., Mfg. Co. 32

N

Nash Engineering Co. ..... —
National Adhesives ..... —
National Aluminate Corp. .... —
National Aniline Div., Allied Chem. & Dye Corp. 19
National Starch Products, Inc. . —
National Tube Co. ..... —
Naugatuck Chem. Div., U. S. Rubber Co. ..... —
Niagara Alkali Co. ..... —
Nichols Engrg. & Research Co. 12
Nopco Chemical Co. ..... —
Northern Engraving & Mch. Co. —
Norton Co. ..... —

O

Oldbury Electro Chemical Co. . —
Oliver United Filters, Inc. .. 33

P

Paper & Industrial Appliances . 27
Parsons & Whittemore 109
Peabody Engrg. Co. ..... —
Perkins, B. F., & Sons Co. .... —
Perkins Goodwin Co. ..... —
Permutit Co., The ..... —
Photovolt Corp. ..... —
Pittsburgh Plate Glass Co. .... —
Plaskin Div., Libbey-Owens-Ford —
Poirier Control Co. ..... —
Potdevin Machine Co. 111
Powell, William, Co. 85
Price & Pierce, Ltd. 116
Pulp & Paper Trading Co. .... —
Pusey & Jones Corp., The .... —

R

Railway Supply & Mfg. Co. .. —
Raymond, Chas. P., Service, Inc. 113
Reading Crane & Hoist Co. ... —
Record Fdy. & Machine Co. .. —
Red Ray Manufacturing Co., Inc. 111
Reichhold Chemicals, Inc. ..... —
Reidel, Gus, & Son 104
Reliance Elec. & Engrg. Co. .. —
Research Corp. 34
Restigouche Co., Ltd. 100
Rice Barton Research Corp. .. 89
Rogers, S. C., & Co. 119
Rohm & Haas Co. 81
Roosevelt Paper Co. ..... —
Roots-Connersville Blower Corp. —
Ross, J. J., Co. 114
Ross, J. O., Engrg. Corp. ..... —
Ross Paper Machinery Co. .... —
Rust Engineering Co. 106

S

Sandusky Fdy. & Mch. Co. ... 110
Sandy Hill Iron & Brass Works 106
Seaboard Air Line R.R. Co. .. —
Shartle Brothers Machine Co. . 40
Shuler & Benninghofen ..... —
Simonds Saw & Steel Co. .... —
Sinclair Refining Co. ..... —
Sirrine, J. E., Co. 116
SKF Industries 28
Smidth, F. L., & Co. 22
Smith & Winchester Mfg. Co. . 105
Socony Vacuum Oil Co. Inc. ..... Back Cover
Sonoco Products Co. 118
Spray Engineering Co. 108
Sprout, Waldron & Co., Inc. .. 35
Squier Corp., The .....
Stebbins Engrg. & Mfg. 125
Stein, Hall & Co., Inc. 120
Stephens Adamson Mfg. Co. .. 103
Stickle Steam Specialties Co. . —
Stowe Woodward Inc. ..... —
Sun Oil Co. 38
Sutherland Refiner Corp. 13
Swenson Evaporator Co. ..... —

T

Taylor Instrument Co. ..... —
Taylor Stiles & Co. 124
Tennessee Coal, Iron & R. R. Co. ..... —
Testing Machines, Inc. ..... —
Texas Co., The ..... —
Texas Gulf Sulphur Co. ..... —
Thwing-Albert Instrument Co. . —
Thiele Kaolin Co. 59
Tide Water Assoc. Oil Co. 79
Timken Roller Bearing Co. ... —
Tissue Converting Corp. ..... —
Titanium Pigment Corp. 37
Townsend Corp. 101
Traceriab, Inc. ..... —

U

United Carbon Co., Inc. ..... —
U. S. Rubber Co. 87
U. S. Steel Corp. ..... —
United States Steel Export Co. . —
United States Steel Supply Co. —

V

Valley Iron Works Co. ..... —
Vanderbilt, R. T., Co. ..... —
Vaughan, Frank C. ..... —
Virginia Smelting Co. ..... —

W

Waldron, John, Corp. ..... —
Walworth Co. 26
Waterbury Felt Co. 116
Waterbury, H., & Sons Co., Inc. ..... —
Weber, H. G. & Co., Inc. .... —
Wellman Engineering Co. .... —
Western Gear Works 31
Western Precipitation Corp. ... —
West Virginia Pulp & Paper Co. 112
Weyerhaeuser Timber Co. 15
Wheeler Roll Co. ..... —
Whiting Corp. ..... —
Williams Apparatus Co. 98
Williams Gray Company..... 116
Worthington Pump & Machy. Corp. 24
Wyandotte Chemicals Corp. ... 25

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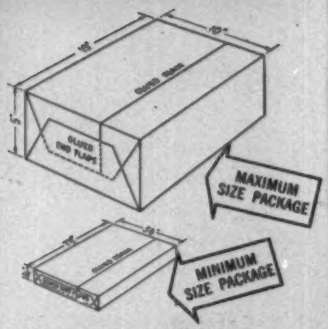

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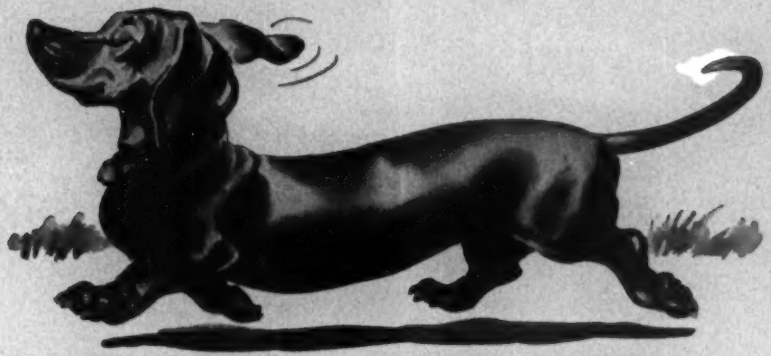

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